Special Report: Apple's Sizzling New Macs!

MacUSER LABS CPU Speed Tests

MacUser

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NOVEMBER 1989

You Can Take It with You!

Macintosh Portable

Apple's Long-Awaited Portable Mac Makes a Splash!

You Can Have It All!

Macintosh IIci

Speed, 32-Bit QuickDraw, Built-In RAM Cache, and On-Board Video



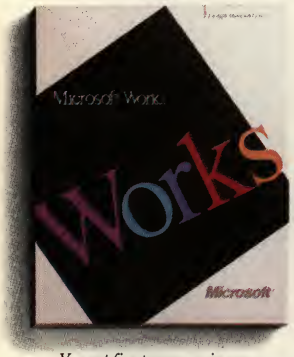
Plus!

- Database Face-Off
- OCR Breakthroughs
- Non-Apple Laptops
- Bargain Hard Drives
- Slide-Maker Shoot-Out
- Optical-Storage Guide
- HyperCard Alternatives

How do you explain the magnitude of Microsoft Works?

Whether you run a small business or your knowledge about computers happens to be less than monumental, Microsoft® Works 2.0 has you covered.

Microsoft Works 2.0 is actually five tools in one: word processing, spreadsheet, database, drawing and communications. But as far as you're concerned, it's one integrated program—so it's easy to move between the different productivity tools and use them together.



You get five programs in one—and incredible efficiency when you combine their talents.

In fact, from the moment you take it out of the box, Microsoft Works 2.0 is easy to use. It comes with an animated training program written in HyperCard® format. As well as on-line help and unlimited phone support to help answer any questions you may have about Works' features.

No matter how varied your projects are, Microsoft Works 2.0 can handle the job. Its newest feature, the drawing module (with page layout), can take an otherwise dull, fact-filled document and turn it into one full of compelling graphics.

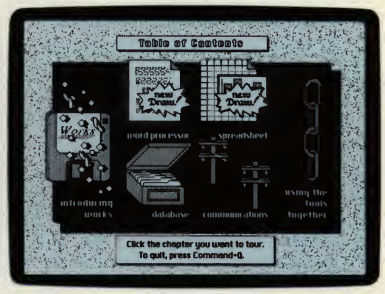
The word processor can create everything from a simple memo to a detailed report—and it even includes a spell-checker aimed at eliminating typos.

Of course, if your document needs to be supported with numbers, you can always jump over to the spreadsheet to compute and analyze data. And then transform it all into easy-to-read, easy-to-understand charts.

As for information that keeps your business going, the database is indispensable for keeping track of clients and orders.

And you can count on the communications module to bring information to your desktop through a modem.

If you'd like to learn more about Microsoft Works 2.0, just call (800) 541-1261, Dept. I175 for the name of your nearest dealer.



To help get you started, we've included an animated training program written in HyperCard format.

No wonder Microsoft Works 2.0 is the best selling application in its class. Aside from being a great value, Microsoft Works 2.0 is one program that can handle a myriad of business needs.

It's that simple.

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Making it all make sense™

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It's simple.

HOME FRONT

MARTIN REALTY

Real Estate News for the Greater Aspen Community – Published by Martin Realty

Lowest Lending Rates Since 1983!

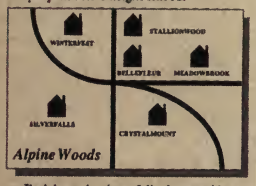
Last week mortgage interest rates reached a five-year all-time low. First Mortgage offered a 30-year, 95 percent new home loan at 8.5 percent with no points. Unheard of in recent years.

Resale of homes has jumped 13 percent over sales recorded during the same period last year.

New Home sales are up 17 percent. Several local lenders have put together special new home financing packages in cooperation with local contractors. Call our Aspen office at (426) 838-2961 for details.

Crown Construction Opens This Year's Alpine Woods Development

The Alpine Woods development will be open for public tours from July 15 until August 21. Each home represents a distinct style from contemporary to French provincial – all homogeneously placed to create a uniquely attractive neighborhood.

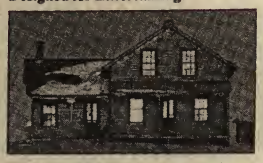


Each home has been fully decorated by a local interior design firm and each is singular in its own way. Whether you're just shopping for ideas, we recommend this year's Alpine Woods development.

You can park at the Denny Shopping Center and take a tour bus from there between 9:00 a.m. and 6:00 p.m. daily.

HOME OF THE MONTH

Lakefront Country House: Designed for Entertaining!



This lovely brick and cedar country house can be found just fifteen-minutes from downtown Aspen. Nestled in giant firs, it represents true Colorado style!

The master bedroom suite features a panoramic view of Lake Diamond. The master suite also has his-and-hers walk-in closets, a separate vanity, and a stunning shower area made of glass bricks.

The living room, study, family room, and bedrooms (2+) feature hand-polished redwood panelling and skylights.

The three-car garage has special wall-mounted ski racks and an extra-sized third stall to accommodate up to a 24-foot boat.

Two additional baths, a stone fireplace, 800 square feet of decking, three wooded acres, and a private dock complete this rural dream home.

MARTIN REALTY

July 28, 1988

Gary and Lisa Elliot
533 4th Street
Denver, CO 54556

Dear Gary and Lisa,

This Saturday, I look forward to showing you a few of the quality homes in the Aspen community.

Per our phone conversations, we will be looking at family homes with a minimum of four bedrooms, two-and-a-half baths, a family room, and a three-car garage. It sounds like you are a pretty active family, so I've also chosen homes with a "mud room" for changing wet boots, etc.

One issue that we haven't really discussed is schools. Before Saturday, you might want to jot down a few priorities. Public, private, parochial? Level needed--from pre-school to college. And any special needs your children may have, like proximity to an indoor pool or gym.

I can also put you in touch with any youth organizations you may be interested in like The Boy Scouts or 4-H. We have it all.

You mentioned wanting a fairly good-sized lot. Does this mean that you will need stables or a barn? I can even put you in touch with a local riding stable if you wish.

Since you plan to be here for the whole weekend, let me know if I can be of any help with hotel reservations or activites. I can arrange for anything from theatre tickets to a riding lesson. Whatever might make your stay more pleasant, and leave a good impression of Aspen.

It's a beautiful place and we're happy that you've decided to make it your home.

Sincerely,

Peter Cohen
Residential Agent

cc:file



MARTIN REALTY

PETER COHEN
RESIDENTIAL AGENT

The Horvath Family
445 28th Street
St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

The Stefls
14 Lamplighter Lane
Ridgefield, VT 29333

The Horvath Family
445 28th Street
St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

The Stefls
14 Lamplighter Lane
Ridgefield, VT 29333

The Horvath Family
445 28th Street
St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

Greg Voornas
1013 Scott Road
Boston, MA 31222

Kathryn Windle
Main Street
Saline

Gary and Lisa Elliot
533 4th Street
Denver, CO 54556

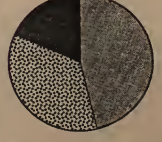
MARTIN REALTY

...Design Place
...Santa Cruz, CA 66667

COMMISSIONED SALES REPORT—JUNE

Sales Person	Type	Rate	Sales YTD	Billings	Check Amt.
Shannon Pitts	Commercial	3.80%	$275,000	$88,000	$3344.00
Lisa Doan	Residential	3.00%	$320,000	$120,000	$3600.00
Peter Cohen	Residential	3.00%	$230,000	$100,000	$3000.00
Robbie Ross	Commercial	4.00%	$500,000	$340,000	$13600.00
Mike Lucero	Residential	4.00%	$150,000	$65,000	$2600.00
Gary Gigot	Residential	7.00%	$700,000	$260,000	$18200.00
Mary Freeman	Residential	3.80%	$450,000	$60,000	$2280.00
Joan McArthur	Residential	2.60%	$250,000	$99,000	$2574.00
Barbara Miller	Commercial	3.00%	$250,000	$130,000	$3900.00
Robyn Komachi	Commercial	2.80%	$780,000	$240,000	$6720.00
	Residential		704,000		
	New		325,000	46.16%	
	Prev. Owned		250,000	35.51%	
	Land Only		129,000	18.32%	
				100.00%	

Breakdown of Residential Sales



New	46.2%
Previously Owned	35.5%
Land Only	18.3%

Everything you see above was created using some combination of the five tools within Microsoft Works 2.0: word processing, spreadsheet, database, drawing and communication. As you can see, the real power of Microsoft Works 2.0 comes into play when all the tools are used together.

MacUser

Special Report

Two New Macs



Mac to Go

BY JOHN J. ANDERSON AND JOHN RIZZO

It's here! Apple's finally unveiled its innovative portable, and it's a movable feast of advanced technology that's sure to set new standards for computing on the go: an active-matrix LCD screen, onboard static RAM, a slick new trackball, and a dedicated microprocessor to monitor power consumption. But is the Mac Portable small enough to make it big? Also, a peek at third-party alternatives to Apple's lightweight heavyweight. **96**

Macintosh IIci: New Speed Champ

BY JOHN J. ANDERSON

The high end just went a little higher. If it's speed you want, Apple's new 25-megahertz IIci won't disappoint. More than half again as fast as its predecessor, the IIcx, this Mac points to Apple's vision of the future: static-RAM-cache card, 8-bit color-video circuitry mounted directly on the logic board, support for up to 4 gigabytes of main memory, and the most elegant logic board that Apple has ever offered. **46**



Features

In Single File

BY KEN LANDIS

You don't need a helicopter to cross the street, do you? So how powerful a database program do you *really* need? Today's flat-file databases have shed their image as computerized index cards. The new nonrelational Mac databases are more affordable, faster, and easier to set up than their relational cousins, but they still deliver plenty of muscle and features such as powerful search options, integrated graphics, and flexible report generation. **114**

Letting in the Light

BY JOHN RIZZO

Optical storage may be the high-tech tsunami of the future, but it's little more than a ripple in the Mac marketplace today. Now may be the time to invest in this mass-storage medium, but which type? Erasable, write-once, or read-only? And how well does it work? Who can use it now? Will it ever be fast enough? And when will it finally catch on? We shed some light on the optical options. **132**

StartUp

News

EDITED BY RUSSELL ITO

Apple announces a price breakthrough for the SE, Bawamba returns with an OPEN LOOK, and Apple shares its venture-capital largess — plus news, rumors, the hottest new products, upgrades of old favorites, and more. **46**

Reviews

Plus and **SuperCard** offer feature-rich alternatives to HyperCard. **60**

QuickMail becomes quicker but remains quirky. **62**

WordMaker aims for the low-end word-processing market. **67**

atOnce! delivers a powerful business-finance tool. **68**

Streamline does auto-tracing only — but lots of it. **70**

StarTime/VideoShow adds portability to presentations with an unusual software/hardware combo. **80**

Drawing Table is an inexpensive, eight-color draw program. **82**

Three budget hard drives should interest price-conscious buyers. **87**

Departments

Mail Merge

FROM THE MAC COMMUNITY

Readers solve the case of the missing MiniFinders, abandon dBASE Mac, deliver a bad Word rap, and eschew Paul Somerson's wish list. **8**

DTP

EDITED BY AILEEN ABERNATHY AND JAMES BRADBURY

Fine Print

BY JAMES BRADBURY

Kerning can give your publication a professional look, but how much of it do you need to get the results you want? **223**

The Well-Read Mac

BY PHILLIP ROBINSON

Remember how optical character recognition (OCR) was going to retire the typewriter? It never happened because the technology was too expensive and ordinary PCs couldn't handle its enormous computing demands. A new generation of automatic and trainable OCR programs for the Mac promises to change all that. **225**

Bridges

EDITED BY HENRY BORTMAN

Currents

Now that Apple has shipped a router that implements AppleTalk Phase 2 protocols, other vendors are rushing to follow. We survey the field. **245**

Finally Phase 2

BY KURT VANDERSLUIS

The next generation of AppleTalk networks has finally arrived: They're bigger and more efficient, and they talk in tokens. Is it time for you to make the leap to Phase 2? **248**

Bobker's Dozen

BY STEVEN BOBKER

Quick looks at 13 no-nonsense products. Some of this month's stars: SuperGlue II, GOfer, TopDown, Word Wrapper, MacInvoice, and Ft. Knox. **294**

About MacUser **6**

Marketplace **270**

Coming Soon **288**

Advertiser Index **290**

NOVEMBER 1989
VOLUME 5
NUMBER 11

Power Tools

EDITED BY JAMES FINN
AND KRISTI COALE

Technically Speaking

BY RANDY M. ZEITMAN

When you're under the gun with a complicated application, effective technical support can make the difference between success and disaster. Whether it's free or not, here's how to make the technical support you get count. **188**

Inside the Finder

BY MICHAEL SWAINE

Is there something you don't like about the Finder? It's easy (and fun) to change it to the way *you* think it should be. **191**

Modem Speak

BY KRISTI COALE

You see the lights flashing on your modem, but what do they mean? Get full command of your telecommunications by learning how to talk to your Hayes-compatible modem and understand what it says back. **199**

Tip Sheet

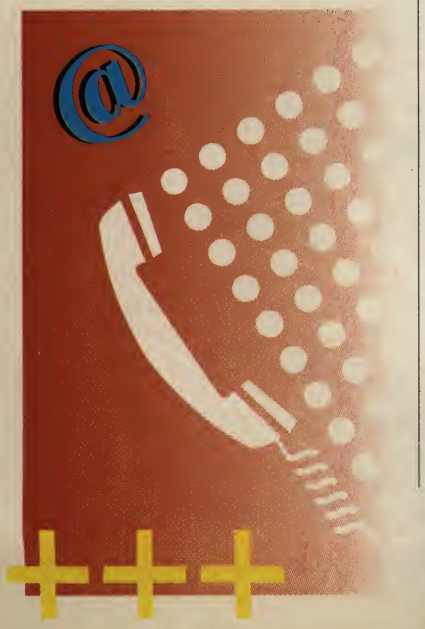
COMPILED BY GREGORY WASSON

Readers send in tips, tricks, and undocumented features for Word 4.0, MacroMaker, Ready,Set,Go!, Wingz, and more. **207**

Help Folder

BY CHRIS ESPINOSA

Capture PostScript information, increase your SE screen size, get more memory for applications, convert sounds, and get your money's worth out of an ImageWriter ribbon. **215**



MacUser Labs

Slide Makers



MacUSER LABS

Graphics on the Slide

BY GREGORY WASSON, JEFF PITTELKAU,
AND AILEEN ABERNATHY

Corporate America will spend enough on slides this year to build 18 stealth bombers. Using service bureaus to create presentation materials has always been expensive and time-consuming, but until recently you had little choice. That could change now that film recorders let you create slides, overhead transparencies, and other materials and have them developed by a photographic lab, just as you would your vacation snaps. It's fast and cheap, and you get greater creative control, but does the quality measure up to what the big guys can deliver? MacUser Labs tested the slide-making powers of seven digital film recorders and had an expert panel scrutinize the results. How did they do? Even we were surprised. **156**

Columns

Paul Somerson
What's small, quick, sporty, and the classiest chassis on the road (*besides* a Miata)? **27**

Robert R. Wiggins
Don't let software pirates sink *your* business. **33**

Jim Seymour
A wisdom of fonts: Seymour's six commandments. **37**

Louise Kohl
Recycling ideas: What can we learn from the NeXT? **43**

John C. Dvorak
Do not adjust your mind-set: You are about to enter the myth dimension. **300**

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PRODUCT ANNOUNCEMENTS AND UPDATES
MacUser is always looking for new and unusual products for our StartUp, Power Tools, Bridges, and DTP sections, as well as for feature coverage. If you've got a product that you'd like to tell us about — whether it's new or an upgrade — send your letters and/or press releases to Michele Stokol, Editorial Assistant, *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

TECHNICAL DIFFICULTIES AND HELP
Although we can't offer any telephone assistance, *MacUser* welcomes your technical questions. If you've got a Mac question or problem, send it to The Help Folder, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. If we can't give you an answer, we'll find someone who can. Because of the volume of mail we receive, we can't answer all of your questions, so we also recommend that you take advantage of your local user groups. You can find the one nearest you by calling Apple toll-free at (800) 538-9696, ext. 500.

TIPS, HINTS, AND PROGRAMS
We love to get tips and hints (on a disk, please) from our readers. Any tips should be sent to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. We can't print every tip, but we try our best to pick the most interesting and representative ones for publication. We'd also like to hear from any programmers who are interested in contributing to our utilities disk series or labs benchmark disk series. If interested, contact Michele Stokol at the same address.

WRITING FOR MACUSER
If you have an idea for an article you'd like to write, we'd like to read it. Send a query letter with samples of your writing (published if possible) and some information about your background to Louise Kohl, Executive Editor, *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. No calls please. Since we rarely buy unsolicited manuscripts, save yourself some work and don't send us a completed article without writing first. Please allow four to six weeks for a reply.

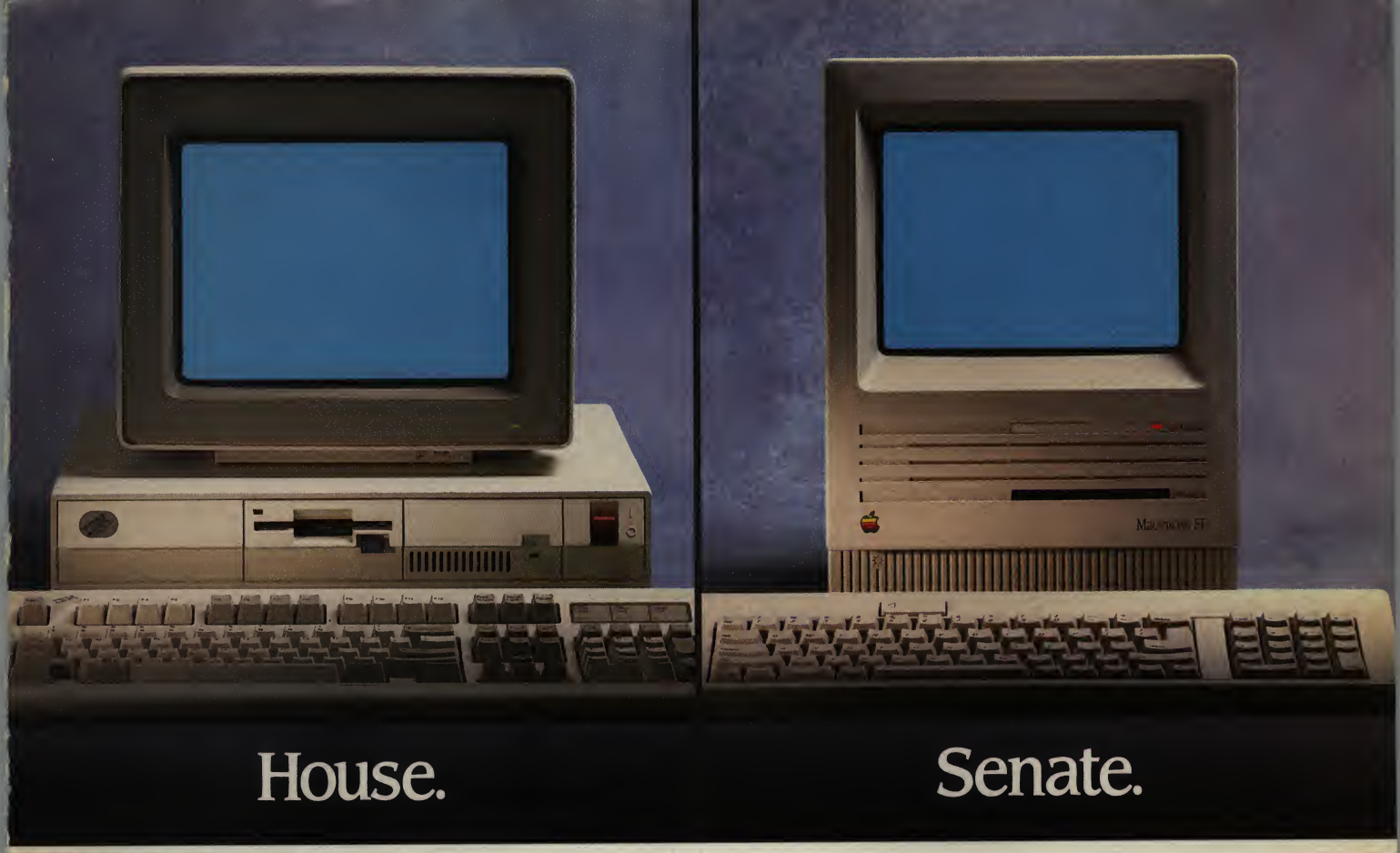
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We found a measure they could both agree on.

Up on the hill it looked like another split along party lines. Both Macintosh and PC users fought for access to the same information. Until a TOPS network brought them together in bipartisan agreement, that is.

Maybe that's why TOPS has been voted the de facto standard for easy Mac-to-PC connectivity by some 600,000 users. All you have to do is install TOPS software in each Macintosh and PC on the network, add a network card to each PC, and you've got a quorum.

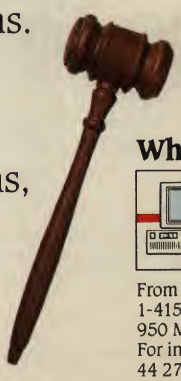
A polished diplomat in any arena, TOPS easily trades data from Lotus 1-2-3 to Excel, Microsoft Word PC to Word Mac and most other Mac and PC applications.

TOPS Tech Specs

- TOPS supports AppleTalk and FlashTalk running on twisted-pair cabling (telephone wire), and EtherTalk on thick or thin Ethernet cabling.
- All IBM PCs, PS/2 Models 25 or 30, or compatibles require TOPS FlashCard, 3Com EtherLink II or Western Digital EtherCard Plus. PS/2 Models 50 through 80, or compatibles require 3Com EtherLink/MC card.
- TOPS can be configured as a distributed, dedicated, or combination server network.

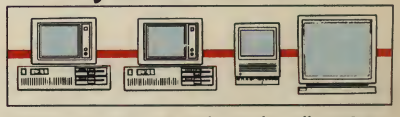
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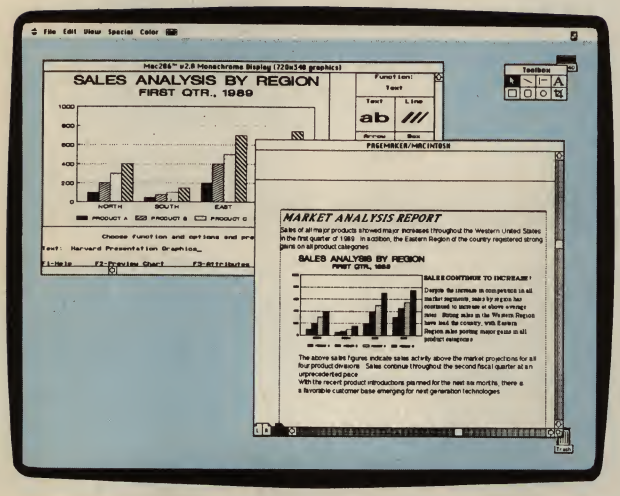
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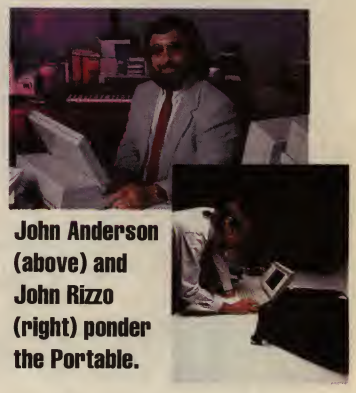
About MacUser...

Honey, I Shrunk the Mac

It was the worst of secrets, it was the best of secrets. The Macintosh Portable was the worst-kept secret in Apple's history because everybody knew that a Mac laptop was a top priority (although it didn't quite end up in the laptop category). After all, Apple was touting the mythical Knowledge Navigator notebook computer as its vision of the not-*too*-distant future.

It was also one of the best-kept secrets, thanks to a constant stream of rumors, decoy prototypes, leaks, and so much misinformation and speculation around Silicon Valley that nobody could trust anything. So when the time came for our first peek at the *real* prototype, we assembled a SWAT team to examine, torture-test, and evaluate it. Armed with experience, skepticism, and a battery of benchmarks, they headed for Cupertino.

Once inside the closely guarded walls of Apple's DeAnza 2 building, and after surviving the canned presentation (which highlighted the technological innovations and design philosophy behind the new machine), the team started hammering away at the Portable, analyzing its strengths and looking for weaknesses — such as the highly touted screen (which looked so bright in a carefully positioned spotlight but also revealed a darker side when tested in a variety of ambient-light conditions). And how well would the Portable (and our Apple hosts) withstand the shock of our "accidentally" dropping the machine? (Hosts and machine both took the fall admirably.) As a machine aimed at desktop multimedia presentations, how well could it handle a complex HyperCard stack full of animations and a wide range of sounds? (It had crisp animations but poor audio quality when faced with a broad dynamic range of sampled sounds.) How would a shoulder feel after hauling this bulky mass around for ten minutes? (It did fine.)



John Anderson (above) and John Rizzo (right) ponder the Portable.

After their initial introduction to the Portable, Technical Editor John Rizzo and Senior Editor John Anderson returned to Cupertino for several additional rounds of benchmark testing. Their experience with other microcomputers (John A. is a veteran of *Computer Shopper* and *Creative Computing* magazines, and John R. is a former Boeing circuit-board designer) gives them the background to put the Mac Portable in perspective. Just how clever is the motherboard? ("Very," says JA.) Did Apple pick the right components? ("Yes," says JR.) Did it jump the gun, releasing the Portable before all the constituent technologies had matured? ("Uh-yup," says JA.) But will Mac users snap up Apple's first fully portable Mac anyway, even with its hefty price tag? ("Uh-yup," says JR.)

Of course, the questions don't stop there: What about non-Apple portable alternatives, such as the Walkmac, DynaMac, and the hot new Wallaby? What's in store for future heavyweight lightweights? What kinds of users will love this new machine — and whom will it disappoint? Fortunately, John and John don't just have questions — they've also uncovered answers (see this month's cover story, "Mac to Go").

More Rave Reviews for the #1 SQL Database.

PC WEEK

Oracle for Mac Solves DBMS Puzzle

SQL/HyperCard Combo Produces Sophisticated Applications

By Susan Janus

Database giant Oracle Corp., of Belmont, Calif., recently rounded out the list of platforms supported by the company's relational database-management system (DBMS) with the release of Oracle for Macintosh.

The new Mac DBMS teams the power of Oracle's Structured Query Language (SQL) with HyperCard's customizable and easy-to-use interface.

This combination allows Mac developers to create sophisticated applications that appear simple to users—a unique software-development opportunity unavailable on any other platform, including the PC, according to early corporate users we contacted.

In addition, users said, the network version of Oracle for the Mac allows the advantages of the HyperCard interface to serve as a front end to existing corporate relational databases residing on other platforms, such as mainframes and minicomputers.

Consequently, the Mac software has great potenti[illegible]

oping database manageme[illegible] systems to connect departmental Macs to larger systems. Jeff Menz, a systems analyst for a scientific R and D organization, is currently using Oracle for Macintosh to develop a system that will give the company's numerous Mac users access to an Oracle database running on a VAX. Using the networking version, Menz will link departmental AppleTalk networks to the VAX over a TCP/IP network.

Oracle Provides the Groundwork

The key benefit of Oracle's product is that "all the fundamental technical work—the protocols, the compatibility with the AppleTalk network—has been done by Oracle," Menz said. "I just have to build the HyperCard interface and do the database design work."

The result will be an Oracle relational-database application on the VAX with a HyperCard front end that Mac users feel comfortable with, he explained. Also, the company will have one logical relational database instead of numerous fragmented local databases. This allows tighter security, improved data integrity and better performance, he added.

Oracle for Macintosh

DBMS Brings New Power and Face to Mac Application Development

WHAT CORPORATE BUYERS LIKE

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MAIL MERGE

Larry Pardue of Carlsbad, New Mexico, objects to our explanation of the difference between nanoseconds and milliseconds (StartUp, September '89). "You state that 'light travels 19 miles — or the length of Manhattan plus 6 miles — in one millisecond.' Hmm — 19,000 miles per second seems pretty slow since the accepted figure for the speed of light is around 186,000 miles per second. Here in the clean air of New Mexico, light travels about 186 miles in a millisecond." Thank you, Larry; now we see the light.

WRITE TO

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COMPILED BY JAMES BRADBURY

AI or Sci-Fi?

Paul Somerson's wish list ("Software to Watch Over Me," July '89) smacks of neither 1984 nor 2001 but of the 1950s and Robby the Robot. A DTP system, for instance, should not act like an assistant who is constantly attempting to whip your newsletter into a more acceptable layout. Do you really want your publication designed by software engineers? The day when computers can perform the "not all that difficult" decision-making tasks of designers and editors will be the day that perfect artificial-intelligence systems are running on platforms with, say, a billion or more parallel processors.

What we, the users, really need are just better tools to do our jobs. Because we may have to wait till the next Ice Age before we see a program that's more innovative, creative, and talented than a plain old artist with razor, boards, and rubber cement in hand.

David Kries
Cypress, CA

Don't look now, but the next Ice Age may be just around the corner. Within five years, most desktop computers will employ RISC processors with enough built-in parallel-processing power to handle the kind of challenge you describe. RISC coprocessor boards for the Mac can already propel performance into the low supercomputer range. — JR

MiniFinders Keeper

I never kept back issues of magazines until *MacUser*. I've kept every copy since the magazine was first published, primarily because of MiniFinders. I never buy or recommend a piece of software without first checking MiniFinders to see how you rate and compare it against similar products. Then I go back and read the original review for further information.

This has made *MacUser* much more than just another computer magazine; it has become a reference manual. So you can understand how distressed I was to see that the July '89 issue did not include MiniFinders.

Larry Dickerson
Sun Prairie, WI

Relax — MacUser*'s MiniFinders haven't gone the way of the Mac System's now-extinct MiniFinder, for which they were named. But we are experimenting with running them quarterly, to provide more space for reviewing more new products. If you'd like to see them more (or less) often than every three months, let us know.* — JZ

dBASE Mac Attack

I enjoyed your article on databases ("The Data Chase," December '88). I wish I'd had it a year ago when I had assumed that my previous experience with dBASE II would be transferable to dBASE Mac. What a rude awakening! Not only is dBASE Mac a completely different application with different rules, language, and concepts, but it is also so complex that even simple projects require dedicated, extensive sessions to be carried out.

The good news: I discovered Fox Software's FoxBASE+/Mac. This is the program I had expected from Ashton-Tate. It is clean and swift and reads all my old dBASE II files! Any ideas for what to do with all the dBASE Mac books, disks, charts, magazines, and so on that I bought? I wouldn't feel right giving them to anyone, much less selling them....

Stuart J. Hayward
Southampton, Bermuda

Ashton-Tate, which has plenty of other troubles to keep it busy (see NewsLine! in this month's StartUp), has no current plans to develop future versions of dBASE Mac. It is, however, planning a dBASE IV-compatible Mac product (would that make it a FoxBASE+/Mac clone?). Although dBASE Mac is still in the official product line, you can draw your own conclusions. As for all those books and manuals: You live in Bermuda — how about an artificial reef? — JB

Some Novell Ideas

Thanks for a good introduction to Novell's NetWare for the Mac (September '89). You say that NetWare's performance is roughly equal to that of AppleShare's on an SE/30. But what kind of PC did you use for NetWare? You mention 286 machines frequently in the article, but you never say what type of server you actually used. I assume that all tests were run over LocalTalk, not Ethernet, even though you didn't say that.

Dave Kosiur
Fullerton, CA

Thanks for giving us the chance to clarify a few things. The machine used as the NetWare server, the Compaq Deskpro 386/20 with the necessary hardware, is listed first in the costing chart. Our article covered NetWare in the context of a Mac-only network, and we explicitly

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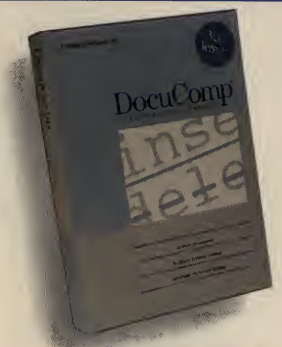
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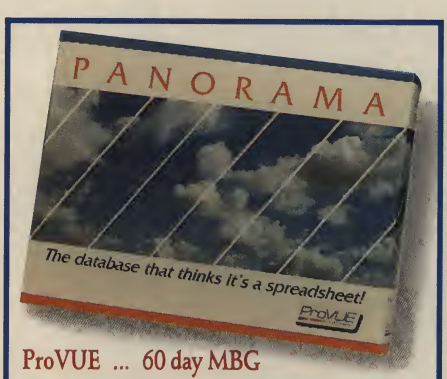
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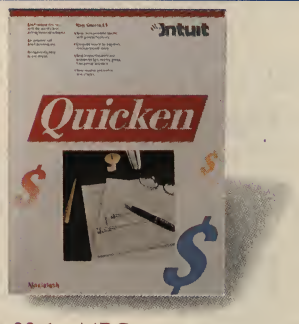
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2636 MacKanji 6.0 . . . . . 59.
2645 MacChinese Mandarin . . . . . 79.
2641 LaserHebrew . . . . . 79.
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4952 VideoWorks II HyperCard Driver 1.2 60.
4954 VideoWorks II Accel. 1.1 . . *special* 99.
5087 MacroMind Director 1.0 . . . . . 449.

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5516 MacAtlas *(Paint version)* . . . . . 45.
5514 MacAtlas *(EPSF version)* . . . . . 119.
5513 MacAtlas *(Professional version)* . . . 119.
5515 MacAtlas Presentation Pack . . . . . 119.

Mindscape
5768 ZING 1.0 . . . . . 139.

★NuEquation ... 30 day MBG
5428 NuPaint 1.0.4 . . . . . 89.

★Paracomp ... 30 day MBG
4597 Swivel 3D 1.1 . . . . . 249.

★Silicon Beach ... 60 day MBG
3504 Silicon Press 1.1 . . . . . 52.
3506 SuperPaint 2.0 . . . . . 128.
3980 Digital Darkroom 1.1 . . . . . 249.
3507 Super3D 2.0 . . . . . 319.

★Solutions Int'l. ... 60 day MBG
3446 The Curator 1.05 . . . . . 72.

★SuperMac Software ... 60 day MBG
3380 PixelPaint 2.0 . . . . . 229.
5625 PixelPaint Professional . . . . . 399.

★T/Maker ... 30 day MBG
3632 ClickArt Business Images . . . . . 28.

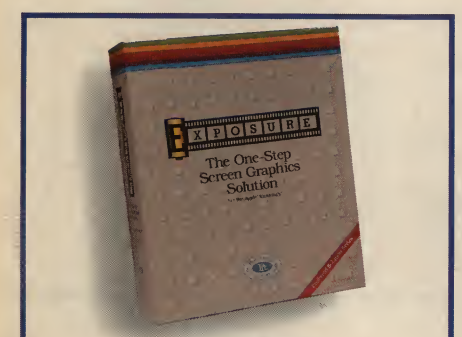
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3642 ClickArt Publications ..... 28.
3633 ClickArt Christian Images ..... 35.

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3942 Images with Impact: Graphics 1 ... 52.
4583 Images with Impact: Business 1 ... 65.

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3986 DeskPaint & DeskDraw 2.01 ..... 65.

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Adobe Systems

5750 Adobe Type Manager ..... 57.
1138 The Collector's Edition ..... 79.
4816 The Collector's Edition II ..... 139.
5001 StreamLine 1.0 ..... 229.
5605 True Form 1.0 ..... 229.
5606 True Form Runtime ..... 175.
1137 Adobe Illustrator '88 1.6 ..... 289.
1142 Newsletters/Publishing Pack 1 ... 239.
4565 Forms and Schedules Pack 2 .... 289.
4566 Presentations Pack 3 ..... 289.

MacConnection carries the entire Adobe Type Library (volumes 1-106). Listed below are Adobe's newest typefaces at press time.

5240 85 Gothic 13 ..... 95.
5241 86 Cochin ..... 125.
5242 87 ITC Bauhaus ..... 125.
5243 88 Sabon ..... 125.
5244 89 Hiroshige ..... 239.
5245 90 Arnold Bocklin ..... 125.
5246 91 Dom Casual ..... 95.
5247 92 Post Antiqua ..... 95.
5248 93 Folio ..... 125.
5249 94 Linoscript ..... 95.
5250 95 VAG Rounded ..... 125.
5675 96 Akzidenz Grotesk ..... 125.
5674 97 Impressum ..... 95.
5673 98 Bauer Bodoni ..... 125.
5672 99 New Aster ..... 239.
5671 100 Adobe Garamond ..... 179.
5670 101 Adobe Garamond Expert Coll. 125.
5669 102 Candida ..... 95.
5668 103 Franklin Gothic No. 2 ..... 95.
5667 104 Utopia ..... 179.
5666 105 Utopia Expert Collection ..... 125.
5665 106 ITC Berkeley Oldstyle ..... 239.

★Aldus ... 30 day MBG

1330 Freehand 2.0 ..... $349.
4751 Persuasion 1.0 ..... 375.
1331 PageMaker 3.01 ..... 389.

Altsys

1195 Fontographer 3.0 *(CP)* ..... 249.

★Antic Software ... 30 day MBG

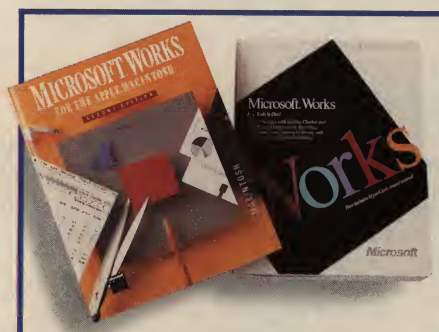
5756 FlexForm Business Templates I .... 52.
5760 FlexForm Business Templates II ... 52.

Broderbund

4465 DTP Advisor 1.0 ..... 47.

★Casady & Greene ... 60 day MBG

4839 Vivid Impressions ..... 67.
1576 1 Bodoni ..... 46.
1587 2 Sans Serif ..... 46.
1588 3 Ritz ..... 46.
1589 4 Monterey ..... 46.
1590 5 Calligraphy ..... 46.
1591 6 Prelude ..... 46.
1592 7 Coventry-Zephyr ..... 46.
1593 8 Dorovar-Gregorian ..... 46.
1594 9 Cyrillic ..... 46.
1577 10 Bodoni Ultra ..... 46.
1578 11 Sans Serif Bold ..... 46.
1579 12 Sans Serif Extra Bold ..... 46.



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1581 14 Micro ..... 46.
1582 15 Micro Extended ..... 46.
1583 16 Galileo Roman ..... 46.
1584 17 Campanile-Giotto ..... 46.
1585 18 Alexandria ..... 46.
1586 19 Jott ..... 46.
4204 20 Gazelle & Kells ..... 46.
4205 21 Paladin-Abalene ..... 46.
4206 22 Collegiate ..... 46.
4838 Quill Pack *(Vol. 8 & 20)* ..... 89.
4836 Headline Pack *(Vol. 10-12)* ..... 129.
4837 Modern Pack *(Vol. 7, 14-18)* ..... 189.
4834 Distinctive Pack *(Vol. 8, 19-22)* .... 189.
4833 Classic Pack *(Vol. 3-6, & 13)* ..... 189.

Cricket Software

1668 Cricket Graph 1.3 ..... 115.
1670 Cricket Presents 2.0 ..... 285.

★DreamMaker ... 60 day MBG

4840 Cliptures: Business 1 ..... 85.
4841 Cliptures: Business 2 ..... 85.

★Farallon Computing ... 30 day MBG

4684 ScreenRecorder 1.0 ..... 129.
2199 MacRecorder 2.0 ..... $164.

ICOM Simulations

5682 MacKern ..... 115.

Letraset

2621 Ready,Set,Go! 4.5 ..... 275.
2619 Image Studio 1.5 ..... 275.
4709 LetraStudio 1.0 ..... 275.

★Microsoft ... 30 day MBG

2878 PowerPoint 2.01 ..... 249.

★Postcraft Int'l. ... 60 day MBG

3157 Laser FX 1.7 ..... 99.

★Preferred Publishers ... 30 day MBG

5751 Exposure 1.1 ..... 54.

Quark

4621 QuarkStyle 1.0 ..... 175.
3230 Quark XPress 2.1 ..... 495.

★Softstream Int'l., Inc. ... 60 day MBG

4996 UltraSpec 1.0 ..... 95.

★Springboard ... 30 day MBG

3530 Certificate Maker 2.0 ..... 22.
3532 Certificate Library ..... 18.
4497 Top Honors 1.01 ..... 59.
4500 Springboard Publisher 1.0 ..... 109.

★T/Maker ... 30 day MBG

3635 EPS Illustrations ..... 74.
5167 EPS Business Art ..... 74.

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Bantam Publishing

1403 Complete HyperCard Handbook .. 23.

★Beacon Technology ... 30 day MBG

4967 HyperBible *(King James)* 1.0 .... 149.
4968 HyperBible *(New International)* 1.0 179.

Borland International

1511 Turbo Pascal 1.1 ..... 68.
1512 Turbo Pascal Tutor 1.0 ..... 46.

Broderbund Software

5237 Whole Earth Catalog *(CD ROM)* ... 89.

★Digitalk ... 60 day MBG

5166 SmallTalk/V Mac 1.1 ..... 129.

★DreamMaker ... 60 day MBG

4115 MacGallery *(HyperCard format)* ... 27.

★Emerald City ... 30 day MBG

5728 LaserTalk 1.0 ..... 159.

★Hyperpress Publish. ... 30 day MBG

5435 HyperOne 1.0 ..... 29.
4233 Icon Factory 1.0 ..... 29.



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5090 Silver Screen 1.0. . . . . 40.
4265 Script Expert 1.0. . . . . 45.
5434 Intelligent Developer 1.0 . . . . . 219.

ICOM Sumulations

5681 HyperTMON . . . . . 59.
4085 TMON 2.8.2 . . . . . 89.

Individual Software

4719 101 Scripts & Buttons Hypercard 1.0 . 36.

★Manx Software ... 60 day MBG

4068 Aztec C 3.6B . . . . . 65.
4317 Aztec SDB . . . . . 65.
4316 Aztec C UniTools. . . . . 65.
4069 Aztec MPW C 3.6B . . . . . 99.
4075 Aztec C + SDB 3.6B. . . . . 99.

★MicroMaps ... 30 day MBG

5513 HyperAtlas . . . . . 59.
5518 QuickMap . . . . . 59.

★Microsoft ... 30 day MBG

4471 QuickBasic 1.0. . . . . 65.

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5446 PLUS 1.1. . . . . 115.

★OWL International ... 30 day MBG

3082 Guide 2.0 . . . . . 99.

★Silicon Beach ... 60 day MBG

5100 SuperCard 1.0 . . . . . 129.

★SmethersBarnes ... 30 day MBG

1478 Prototyper 2.0. . . . . 189.

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5440 HyperHIT 1.0 . . . . . 125.



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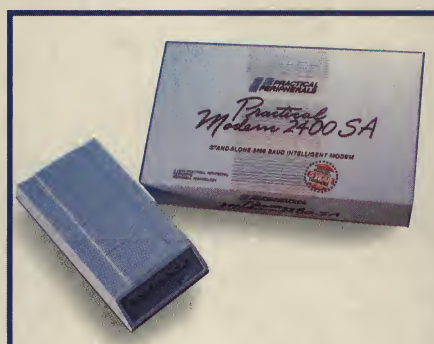
4644 Just Enough Pascal 1.0. . . . . 47.
3421 THINK Pascal 2.0. . . . . 85.
3420 THINK C 4.0. . . . . 149.

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3318 HyperDA 1.2 . . . . . 49.

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1338 Reports! 1.2 . . . . . 69.



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4638 Focal Point II 1.0 . . . . . 117.

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3548 TML Source Code Library II 1.1 . . . 39.
4989 TML Pascal II 3.0 *(w/o MPW 3.0)*. . . 57.
3549 TML Pascal II 3.0 *(w/MPW 3.0)* . . . 109.

Trendware

5203 Stack Cleaner. . . . . 29.
5202 HyperTools #1 1.02. . . . . 52.
5199 HyperTools #2 1.03. . . . . 52.
5609 XCAL 1.0 . . . . . 79.

True BASIC, Inc.

3587 True BASIC 2.01 . . . . . 59.
3571 Algebra Utilities . . . . . 35.
3575 Calculus Utilities . . . . . 35.
3580 Pre-Calculus *(with Trigonometry)*. . . 35.
3583 Scientific Graphics Tool Kit . . . . . 49.

★Zedcor ... 60 day MBG

3985 ZBASIC 5.0. . . . . 95.

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5236 CanOpener 1.0 . . . . . 65.

★Affinity Microsystems ... 60 day MBG

1014 Affinifile 1.1. . . . . 45.
1016 Tempo II 1.02 . . . . . 79.

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5737 After Dark 1.0. . . . . 25.
1541 Stepping Out II 2.01 . . . . . 50.

Beyond, Inc.

4203 MenuFonts 2.02 . . . . . 28.

Borland

1510 Sidekick 2.0 . . . . . 68.

★Bravo ... 30 day MBG

5404 SPAMM 1.0 . . . . . 49.

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2269 QuickDEX 1.4A . . . . . 31.

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1727 CalendarMaker 3.0. . . . . 32.
1728 DiskTop 3.0.4 . . . . . 32.

4689 MockPackage Plus Utilities 4.4 . . . $32.
1729 QuicKeys 1.2 . . . . . 65.

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5040 Copy II Mac 7.2 . . . . . 24.
5041 PC Tools Deluxe Mac 1.1 . . . . . 46.

Connectix

5727 Virtual 2.0 . . . . . 125.

★Dantz Development ... 30 day MBG

5255 Retrospect 1.0 . . . . . 155.

Dubl-Click Software

1824 Calculator Construction Set 2.0. . . . 46.

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1843 Disk Tools Plus 1.01 *(Batteries Incl.)*. 31.

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4287 PYRO! 3.3 *(screen saver)* . . . . . 15.
3954 PowerStation 2.5. . . . . 34.
3955 Suitcase II 1.2.2 . . . . . 45.
5178 FastBack II 1.0 . . . . . 108.
5725 DiskLock 1.0. . . . . 108.

★HJC Software ... 30 day MBG

4803 Virex 2.0. . . . . 59.

ICOM Simulations

4084 On Cue 1.3. . . . . 35.

Ideaform

2419 DiskQuick 2.10. . . . . 27.
2420 MacLabeler Plus 3.0. . . . . 42.

★Kent Marsh Ltd. ... 30 day MBG

5457 QuickLock 1.0 . . . . . 57.
2591 The NightWatch 1.03 . . . . . 87.
2592 MacSafe 1.08C. . . . . 87.

★Loop Software ... 30 day MBG

5442 PictureBook . . . . . 40.

★Lundeen & Assoc. ... 60 day MBG

2683 WorksPlus Command 2.0. . . . . 57.

MEDIAGENIC

4591 Open It! 1.0 . . . . . 49.

★Microlytics ... 60 day MBG

2732 GOfer 2.0 . . . . . 47.

★Microseeds Pub. ... 60 day MBG

4848 INITPicker 1.0. . . . . 27.



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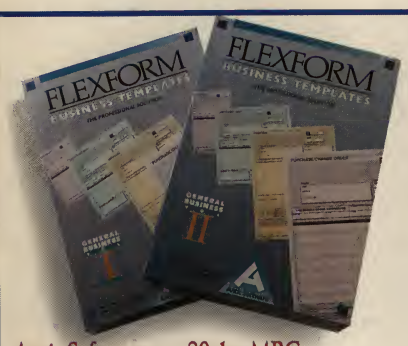
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2913 Redux 1.5 ..... 52.

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3175 HFS Backup 3.0 ..... 54.

★Solutions Int'l. ... 60 day MBG

3448 SmartScrap & The Clipper 2.1 .... 45.
3449 SuperGlue II 2.0 ..... 62.

★SuperMac Software ... 60 day MBG

3381 Sentinel 2.0 ..... 89.
3383 SuperSpool 5.0 ..... 59.
3382 SuperLaserSpool 2.0 ..... 89.
3378 SuperLaserSpool 5-Pack 2.0 .... 295.
3377 DiskFit 1.5 ..... 59.
3379 Network DiskFit 1.5 ..... 229.

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5176 Symantec Anti-virus for Mac 1.0 ... 63.
5724 Symantec Utilities for Mac II ..... 95.

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3779 DiskFinder ..... 29.
3783 myDiskLabeler w/Color 2.9.1I ..... 29.
3784 myDiskLabeler w/LaserWriter 2.9.1LI. 34.
3780 ImageWriter II Label Pack *(Qty. 216)* 16.
3781 LaserWriter Label Pack *(Qty. 216)* .. 20.
4976 Sticky Business 1.0.6 ..... 89.

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5177 XTreeMac 1.0 ..... 52.

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5465 ResumExpert *(reqs. MS Word 3+)* . 49.
5749 ResumExpert Cover Letters ..... 49.

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5608 DocuComp 1.11 ..... 89.

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1133 Word Tools 1.2 ..... 42.

Ashton-Tate

1324 FullWrite 1.0 ..... 259.

Claris

1129 MacWrite II ..... 185.

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4700 BigThesaurus 1.0 ..... 59.
1767 Comment 2.0 ..... 59.
1768 Coach Professional 3.0C ..... 115.

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1543 Thunder II 1.0 *(Batteries Included)* . 52.

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2684 WorksPlus Spell 2.0 ..... $57.

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2733 Word Finder 2.0 ..... 36.
4870 Electronic WordFinder 220 ..... 75.

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4969 Word 4.0 ..... 249.

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5048 EndLink 1.0 ..... 58.
4602 EndNote 1.2.1 ..... 75.

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5683 Nisus ..... 249.

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3375 Sensible Grammar 1.5.2 ..... 53.

★Symantec ... 30 day MBG

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4504 Acta Advantage 1.0 ..... 65.



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3800 WordPerfect Mac 1.0.2 ..... 185.

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3792 Spellswell 2.0G ..... 45.
4693 QuickLetter 1.0 ..... 73.

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1215 Practica Musica 2.1 ..... 73.

★Bogas Productions ... 60 day MBG

1461 Studio Session 1.2 SE ..... 46.
4255 Super Studio Session 2.0 ..... 69.
1459 Heavy Metal Rock ..... 14.
1460 String Quartet ..... 14.
1458 Country Disk ..... 14.
4832 Sound Effects ..... 14.
5719 Brass Disk ..... 14.

Bright Star Technology

3961 Talking Tiles 1.0 ..... 27.
1402 Alphabet Blocks 1.0 ..... 30.

Broderbund Software

4314 Type! 1.0 ..... 19.
1423 Jam Session 1.1 *(CP)* ..... 30.
1422 Geometry 1.2 *(CP)* ..... $59.
4067 Calculus 1.2 *(CP)* ..... 59.
1426 Physics 1.2 *(CP)* ..... 59.

Carina Software

5726 Voyager 1.0 ..... 69.

Coda Music Systems

4367 MacDrums 1.01 *(CP)* ..... 31.
4483 Perceive 1.0 ..... 50.
5604 Finale 1.2.6 ..... 479.

Davidson & Associates

1734 Math Blaster! 1.0 *(CP)* ..... 27.
4978 Speed Reader II 1.0 *(CP)* ..... 36.

Electronic Arts

4619 Mavis Beacon Typing 1.2B *(CP)* ... 32.
1846 Deluxe Music Construction Set 2.5 . 84.

First Byte

5294 Puzzle Storybook 1.0 *(ages 3-8)* ... 27.
5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)*27.
3941 SmoothTalker 2.1 ..... 33.
3936 KidTalk 2.0 ..... 33.
3940 First Shape 2.0 ..... 33.
3935 Speller Bee 2.0 ..... 33.

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2277 TimeMasters 1.0 ..... 22.
2276 KidsTime 1.2 ..... 26.
5642 KidsMath 1.1 ..... 26.
4334 NumberMaze 1.0 ..... 26.
2270 American Discovery 2.3 ..... 26.
2273 ConcertWare+ 4.0 ..... 38.
2271 ConcertWare+ MIDI 4.0 ..... 78.

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5453 Talking Math Rabbit 1.0 ..... 31.

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5265 B3 The Basics *(for Mac II w/HD)* . . . 39.
5266 B4 Beyond the Basics. . . . . 39.
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4947 W1 Beginning Level . . . . . 39.
4854 W2 Intermediate Level . . . . . 39.
5098 W3 Advanced Level . . . . . 39.
5418 W4 Additional Features. . . . . 39.
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5269 LP1 Beginning Persuasion . . . . . 39.
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5273 M3 Spreadsheets . . . . . 39.
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5260 A2 Intermediate Illustrator . . . . . 39.
5261 A3 Creating Special Effects. . . . . 39.
5262 A4 Precision Drawing Techniques. . 39.
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5281 FM4 Tips & Techniques. . . . . 39.

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4493 Atlas Explorer *(CP)* . . . . . 28.
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3615 MacEdge II 1.0 *(CP)* . . . . . 27.
3616 Mind Over Mac 1.4 *(CP)* . . . . . 27.
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3755 MacRobots *(CP)* . . . . . 27.
3754 Read-A-Rama *(CP)* . . . . . 32.

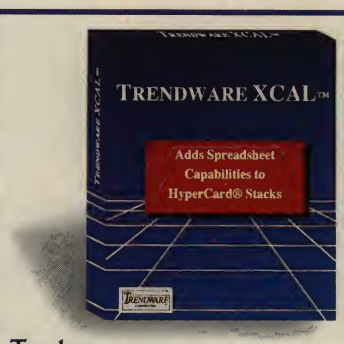
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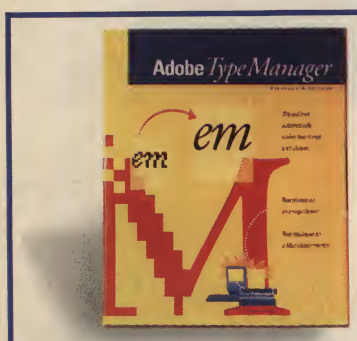
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mentioned that you needed *Ethernet only to do administration from another PC. Most Mac-only nets are LocalTalk.*—SS

Unkind Words

I recently read "The Latest Word" by Charles Spezzano (July '89). When I'd finished crying, I decided to write this letter — using Word 3.01. We know that all your reviewers have Mac IIcx computers with two-page color monitors [*They all drive Jaguars too. — Ed.*]. Some of your readers, however, have humble Mac 512KEs. On these, Word 4.0 is absolutely and irredeemably *slow*. You could boil an egg waiting for it to insert a table or for any of the other fancy new features to operate.

Mark E. Vershbow
West Newton, MA

Although Word 4.0 doesn't seem as bug-ridden as Word 3.0, it has some serious problems. One of them forced me to go back to Word 3.02. When using headlines, you usually define some blank space before them. Word 3.02 skips this additional space when the headline



Dear Mr. Sculley . . .

. . . Apple has come under fire for **System 7**, which will be inaccessible for many users since they'll need 2 megabytes of RAM to exploit its capabilities fully. But such planned obsolescence also has its supporters — as long as the obsolescence is *carefully* planned. Here are some of the comments received for this month's open letter to the top brass in Cupertino: "I endorse Apple's decision to sever reverse compatibility with past machines in favor of operating systems capable of furthering the technology of its newer hardware," writes James H. Hefelfinger of Yardley, Pennsylvania. And Carolyn Jane Gillis of Scarborough, Ontario, Canada, notes that "the upgrade path is the best way to keep the competition — and potential cloners — in the dust. I won't be sorry I got my Mac Plus, even if it becomes totally obsolete and unsupported."

But not everyone is content with being orphaned and unsupported: "Why does Apple design a beautiful full-page monitor and then limit it to users of its new 68030-based models? Do I have to buy from a third party to get the features I want for my Mac?" asks Robert D. Silverthorn of South Lancaster, Massachusetts.

. . . and as Apple ponders how to maintain **interface consistency** next year, as we migrate to System 7 for some machines and stick with System 6 for others, George Pytlik of Vancouver, British Columbia, Canada, reminds Mr. Sculley that "you of all people should remember the lesson of a certain soft-drink manufacturer that foisted an undesired change on its supporters."

Brian Marantz of Irvine, California, suspects that "when System 7 is finally let out of its cage, the chances of Apple offering an incentive to upgrade are about as likely as hell freezing over. I hope some third-party companies offer RAM at cheaper prices so that those who want to can upgrade."

More on **warranties**: "Apple's 90-day warranty is like a car dealer's offer of a 90-day or 900-mile warranty, whichever comes first," notes Jan Beekman of Ceres, California. And C. William Altman of Santa Barbara, California, has some advice for us (and you): "I cannot imagine why you believe your (justified) whining about Apple's overpricing and underwarranting will move Mr. Sculley et al. to change policies. It won't. Consumer complaints have leverage primarily at the cash register; if you want to be heard, you'd best strike in that direction."

Speak Up:

The legal battles over the "look and feel" of the Mac interface may not be completely settled, but it seems clear that other platforms — NeXT's, Sun's, and IBM's OS/2 and Presentation Manager — have made great strides toward intuitive and consistent graphical user interfaces. Many readers note that although they prefer the Mac, they are evaluating these new options.

What must Apple do to keep users from jumping ship?

Send your thoughts to Dear Mr. Sculley, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

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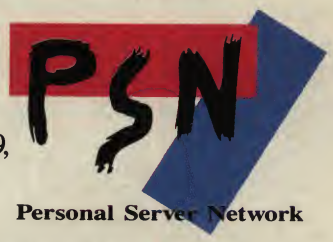
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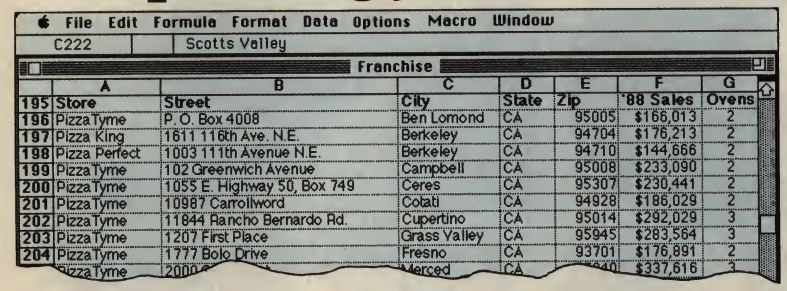


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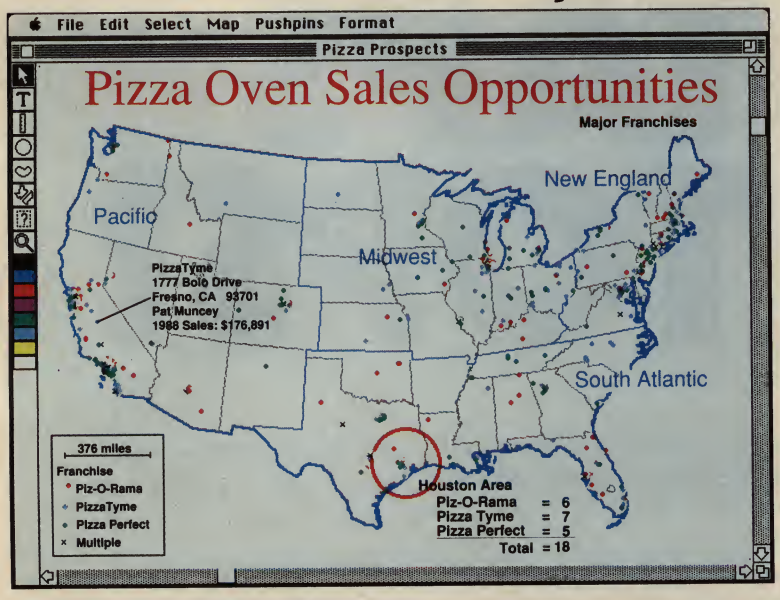
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198	Pizza Perfect	1003 111th Avenue N.E.	Berkeley	CA	94710	$144,666	2
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201	PizzaTyme	10987 Carrollword	Cotati	CA	94928	$186,029	2
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occurs at the top of a page, which is correct since no book would have a headline starting a few lines down the page. In Word 4.0, the additional space is retained! This makes it unusable for professional purposes.

Dr. Loris Biaggio
Giubiasco, Switzerland

Live, from Foster City!

The "dueling reviewers" Russell Ito and James Finn should've stuck with giving detailed reviews, rather than slinging mud at each other. Their reviews of MacWrite II and WriteNow 2.0 ("Word Wrestlers," August '89) made me wonder when one of them would let out with the classic Ackroyd-ism "Jane (James?), you ignorant slut."

Still, as a MacWrite user for more than a year now, I'd like to know exactly what "annoying design decisions" Mr. Finn refers to.

Joe Sewell
Melbourne, FL

Joe, you ignorant slut. A sampling of the annoying design decisions I experienced with MacWrite II include no optional snap-to grid on the ruler, no way to turn off the "feature" of fonts appearing in their own typeface on the Font menu, no way to turn off guessing in the spelling checker, and putting the word-count function into the spelling checker. — JF

Keystroke of Genius?

Does John Dvorak have anything to do with the infamous keyboard? It would be just like him to invent something that won't be universally acceptable till after he's dead.

Diana Barber
Smithville, NJ

Cu C daew yd.f-e x. yflcbi nct. ydco! — HJE

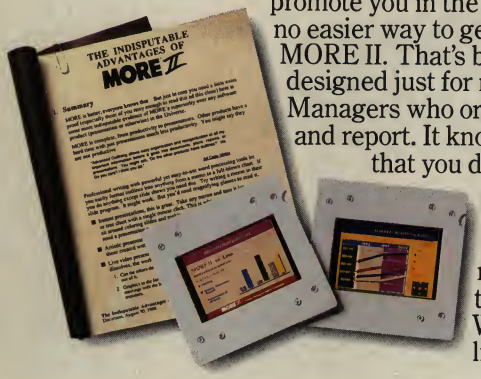
CLARIFICATION

MacLite Oversight

The phone numbers listed in the October '89 StartUp story on Cambridge North America's MacLite portable computer were incorrect. The correct numbers are (800) 366-0088 and (207) 761-3700.

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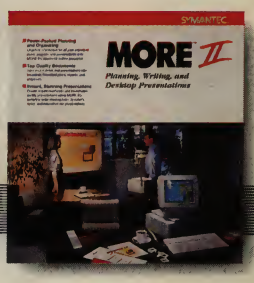


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moves, sublime suggestions,
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paradigm of life. An ever shif
pattern. Of Victory and Defeat.
game unique. Each game a bi
sweet experience. He studied Sun
He read Clausewitz. He explo
Napoleon. He marvelled at
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some would hold a lover. He pl
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called himself a
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Page 1



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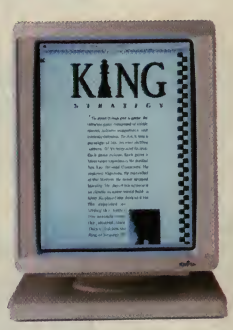
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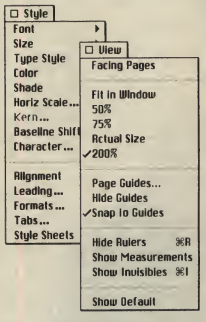
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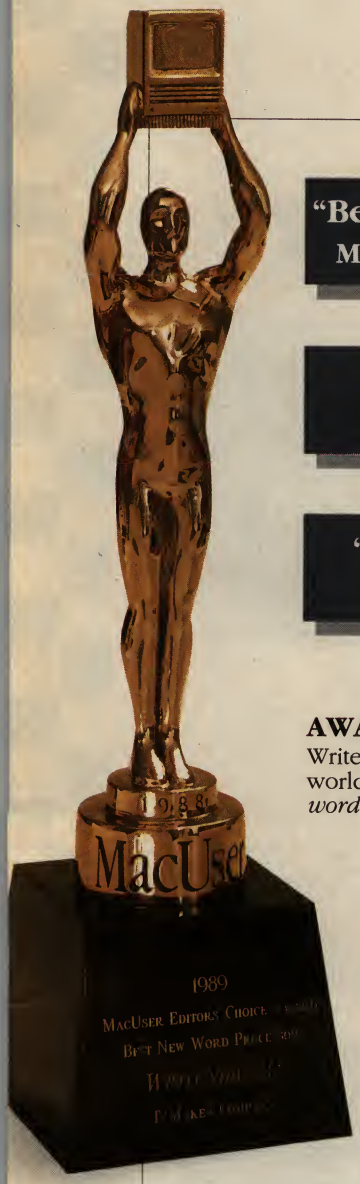
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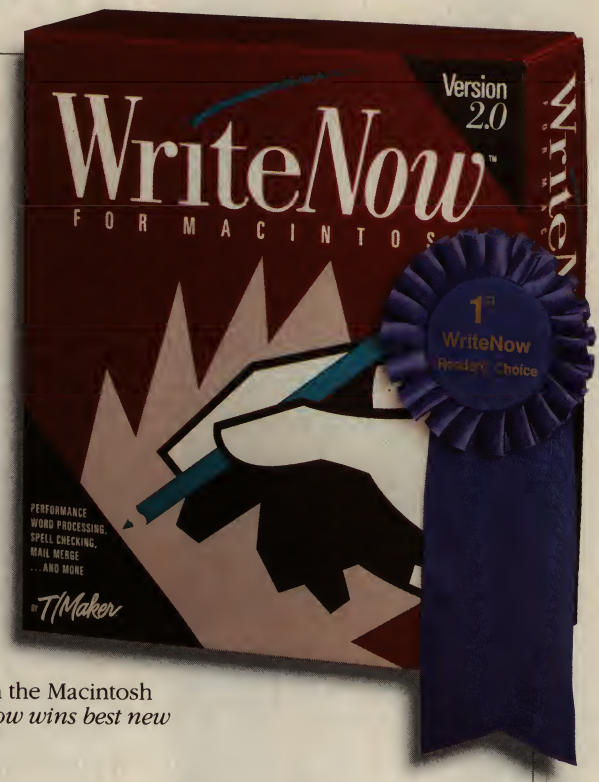
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MS Works 2.0	1 min. 50.8 sec.	35.7 sec.	5 min. 13.4 sec.	2 min. 24.1 sec.	1 min. 14.5 sec.
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PAUL
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One for the Road



By Paul Somerson

This is about image. And glamour. And glitz. It's why executives prefer BMWs over stylish rice-rockets like Nissan's Infiniti or Toyota's Lexus. Or why Ferrari doesn't have much to fear from Chevy's benchmark-busting ZR-1.

OK, if you want to get picky, it's also about brand loyalty and application consistency and sore trapezius muscles. And some good old-fashioned Apple magic.

Until now, if you wanted to take your work on the road, you had three choices. You could shoehorn your files onto an external hard disk and hope you could plug into someone else's Mac when you arrived. You could try shouldering an SE in Apple's svelte stevedore travel case, bent over Sherpa-like, knees buckling under the load. Or you could grit your teeth and wrestle with the arcane command language of a DOS laptop.

But unless you are a salesperson, or a journalist, or another kind of itinerant professional, do you really *need* a portable computer? Absolutely.

When you get down to it, the notion of portability is liberating. One reason that you haven't taken your office with you in the past is that until now it's been next to impossible to do so. Having all your applications at your fingertips means you can work at home or in a client's office or in a lab or library as efficiently as at your desk. And with a cellular phone you can even take your work poolside . . . .

MacUser got the phone call back in July. Apple wanted to know if we'd like to attend a "new-product announcement" (otherwise referred to everywhere outside Cupertino as a "sneak"). This is like having your boss ask you if you have a valid passport. Unless your company has a branch office in Beirut, the answer is always "yes."

Apple's portable hadn't exactly been a nuclear secret. The weekly trade press had already nailed down virtually every detail other than the shape of the handle. It was said to be large and heavy and expensive, with a slick monochrome screen and a trackball, and a battery that just wouldn't quit.

But "large" compared with what? Ditto with heavy. And expensive. Compared with the first hulking DOS portables? With the early Compaq sewing machine? Would you rather spend your money on some Z80-based toy? (At $700 such a CP/M laptop may be a bargain, but the extremely capable Toshiba 1000, when combined with DataViz's MacLinkPlus, is a far better bet.) And what's it really worth to have a genuine Mac and all your customized software with you no matter where you go? Plenty.

For instance, NEC sells an honest laptop called the UltraLight that most DOS users would die for — an incredible machine that weighs in at just over 4 pounds, is only slightly larger than an issue of *MacUser,* runs faster than lots of desktop systems, houses a 2,400-bps modem and a huge nonvolatile RAM disk, has a killer of a backlit screen, and sports a vaguely Mac-like interface with pull-down menus. *But it doesn't run any Mac software.* End of discussion.

So a handful of us editors accept the new-product invitation and find ourselves with a dozen other journalists, and nearly as many edgy Apple employees, standing around in a cozy meeting room making small talk. Every time one of us uses the word *laptop,* one of them quickly corrects it to *portable.* Well, so much for being able to toss it into a briefcase. It didn't matter. Two years of rumors were about to come true.

But first, the inevitable marketing spiel. Actually, as spiels go, this one wasn't bad. Apple VP Randy Battat gets a distant, misty look in his eyes and talks about how Apple's $400 million R&D effort is dedicated to "building broad-base, general-purpose, horizontal tools for people." Sure, we all buy that.

He ticks off his fivefold goals: To reach more people. To tighten the relationship between the person and the computer. To come up with better and more-powerful applications. To understand that the whole is bigger than the sum of the parts. To expand the collective users' reach. So far this is like when grandparents ask your kids what they want for their birthday and they say "world peace."

Then Randy delivers the punch line. "Apple's major objective is to expand the product line at both ends. We're going to reach more people not by dropping prices but by building new entry-level machines at low price-points. And we'll offer more power at the high end."

(Pressing this guy for more details is like haggling with the Sphinx. No dice. Anyway, in a few minutes, we'll see one of the high-end efforts — a machine that truly sizzles. And besides, contacts in the industry have peppered us with informed guesses about low-priced systems. The word on the street is that you'll be able to snap up a brand-new lowball model next April. Good news for disenfranchised DOS users. Great news for dollar-conscious Mac sites. Sensational news for network administrators desperate for Mac data-entry terminals.)

This is like when grandparents ask your kids what they want for their birthday and they say "world peace."

On cue, PR types move toward cloth-draped boxes in the front of the room. We sit up eagerly, pens poised to record

our first Portable impressions. And what happens? We get Fred Benz introducing the IIci (which he calls the "Remington"). Now don't get me wrong, the IIci is a sensational piece of work. But so what if it proves that Apple is on the right track, initially with the II and the IIx, then with IIcx systems so popular they can't stamp them out fast enough, and now with this new high-octane desk-scorcher?

So what if it's been only six months since the last hardware breakthrough and Apple is pushing the envelope *again*? Or that this box is up to 45 percent faster than a IIcx or 70 percent faster than a II? Or that its futuristic circuitry now tames the 68030's burst access mode and boasts an on-board RAM-cache connector, parity-checked memory, built-in video (and an extra free NuBus slot), four gigabytes of address space (compared with the usual 16 megs), and 32-bit QuickDraw in ROM? So what if we watch side-by-side demos that make the IIcx look like a surfer on Quaaludes?

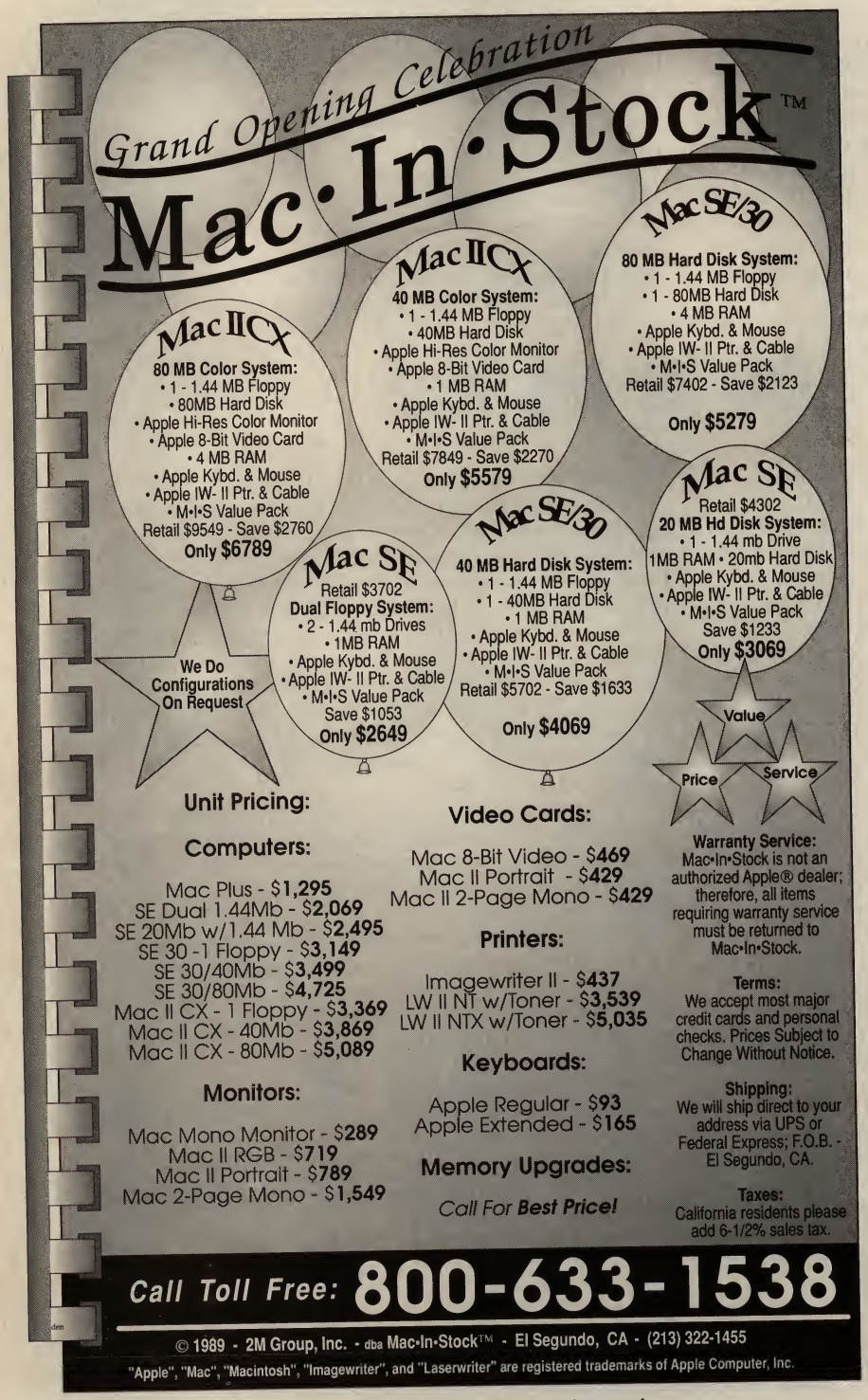
It doesn't matter that Benz is talking about some very interesting stuff. Like what size the cache cards are going to be (32K or 64K) and who's going to sell them (third-party vendors as well as Apple). Or that nearly a third of the standard 1 meg of 80-nanosecond RAM will be sacrificed to handle video (though you'll get 100K back because of QuickDraw in ROM). Or that IIcx owners will be able to upgrade in October or November. Or that the CPU is soldered, which makes it tough for the third-party accelerator industry. ("We're not sympathetic," Benz growls. "Accelerators put an added strain on the system.") OK, nice magic, Apple, but you know why we came.

We watch side-by-side demos that make the IIcx look like a surfer on Quaaludes.

Then suddenly Jim Cook marches to the front of the room, and there it is, under the harsh glare of a bank of miniature spotlights. A creamy-white streamlined wedge of pure technology. The only sound in the room is the pounding of several dozen hearts. In silent unison, 15 journalists' mouths involuntarily form the words "I want one."

Cagey Apple executives sprinkled against the walls take our collective pulse. While some are there to handle pesky press probing, others no doubt have the job of setting the Portable's price. ("Ahh, they love it. Tack on another grand.")

Jean-Louis Gassée isn't physically in



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Built to scale

...you design on a Mac II, a screen that's too small ...from your style. That's why you should be looking into a ... from Sigma Designs.

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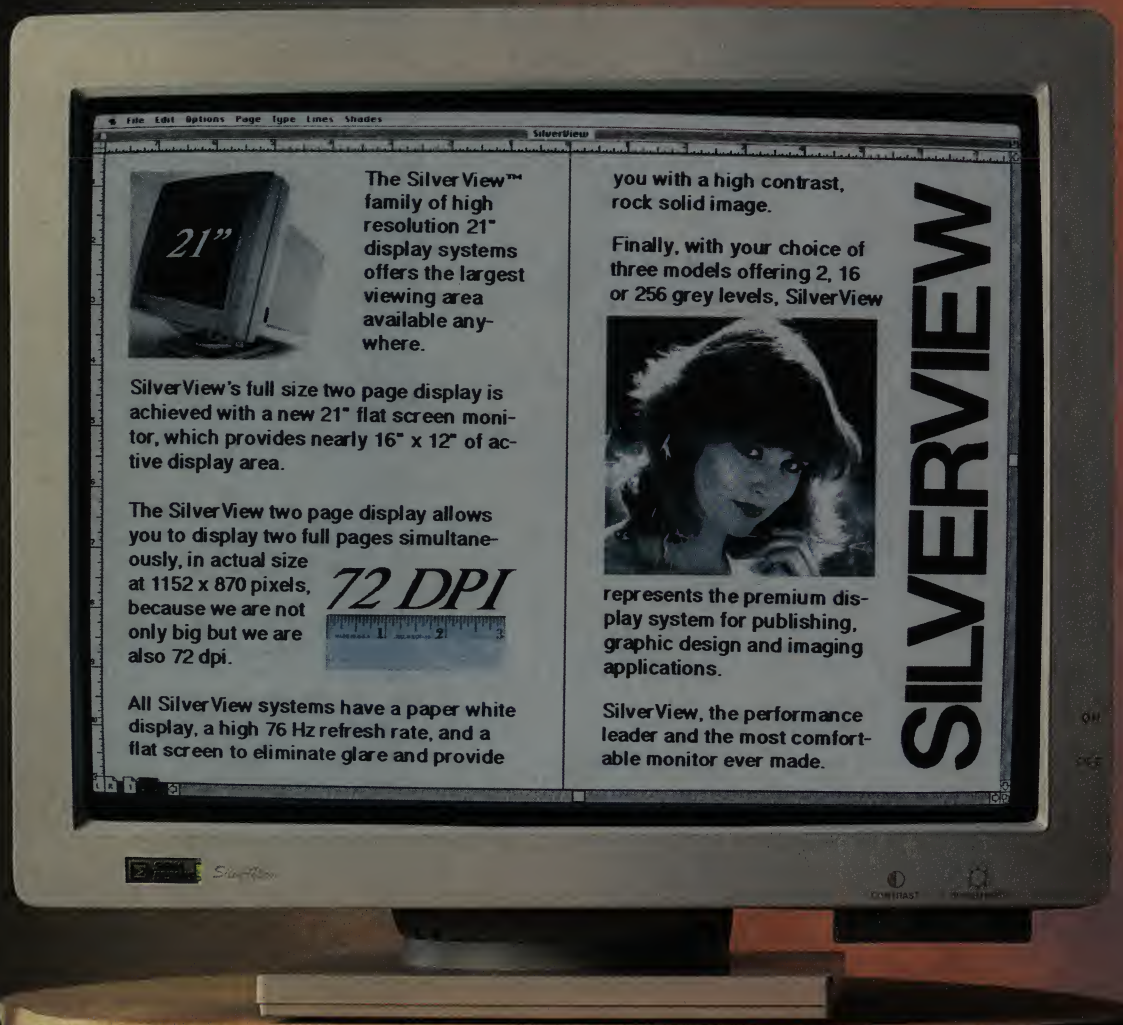
The gray scale.

Besides black and white, there are SilverView models offering 16 or all 256 different shades of gray. So what you used to leave up to the imagination can now be in all your work. Like subtle halftones and delicate shadings.

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the room, but his presence is clearly felt. He's notorious for spinning endless metaphors alluding to various human body parts (the only example of which that can be mentioned here is bobbing Adam's apples) to describe the inherent *sexiness* of hardware. And this *is* one sexy system.

Cook emphasizes that this *isn't* just a niche product. "It's for working/learning/playing/communicating anywhere." Why was it so late in coming? "Portability was the number 2 objective — number 1 was giving it full Mac feel and functionality. It took time to come up with such details as an active-matrix screen that had the necessary speed, wide viewing angle, and enhanced (5:1) contrast."

And why can it keep on humming long after most laptops sputter to a halt — for as many as 12 hours if you sip the Portable's power or as few as 6 if you lean heavily on the hard disk? Apple's high-tech power management (with a Rest mode that kicks in after 15 idle seconds and chops the normal 16-megahertz clock down to 1 megahertz, and a deeper Sleep mode that powers down everything other than the static RAM and a module that waits for the system's wake-up call). Plus a removable lead-acid battery rather than the troublesome NiCads inside every DOS laptop. Why just a 68000? No CMOS 68030s yet. What about SE add-in boards? Timing differences (16 megahertz versus the SE's 8), extra "am I awake or asleep" signals on the Portable bus, and a lean (3 watts versus 15) power budget.

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The pitch ends with a canned phrase: "The power to be your best . . . anywhere." One engineer at the back of the room leans over and says it even better: "I think we hit the sweet spot." How true.



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Pays routine bills automatically	Yes	Yes
Helps you reconcile bank statements	Yes	Yes
Keeps track of income and expenses	Yes	Yes
Keeps track of assets and liabilities	Yes	No
Produces complete financial statements	Yes	No
Handles multiple checking, charge accounts	Yes	Not really
Years of data available in same file	2	1
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Easy to correct mistakes	Yes	No

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DAYTONA BEACH, FL- Twenty MacAcademy™ workshops are now available on video tape. This valuable and exciting new video training series came as a result of a request from Helena, Montana.

One day we received a call from a gentleman wanting more information on our MacAcademy training locations. As you may know, MacAcademy teaches people how to use the Macintosh computer. We teach a lot of people, over 18,000 each year, in 65 major metro areas. We're proud of the fact that both beginning and advanced Macintosh users, all over the country, have found MacAcademy to be an excellent, low priced, training solution.

The gentleman wanted to know when we would be presenting MacAcademy in Montana. Sadly, I had to tell him probably never. There just aren't enough Mac users in Montana to make a workshop financially feasible. I told the caller he could attend in Denver or Salt Lake City, but he still didn't seem satisfied. Finally, he said that if we ever put the workshops on video tape he'd be glad to invest in a set. What a great idea!

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ROBERT R. WIGGINS

Corporate Corsairs

Piracy: The very word seems romantic, calling to mind memories of Errol Flynn movies and rides at Disneyland. Software piracy: It conjures up a subtle blending of technology and romance, evoking visions of high-tech buccaneers sailing the networked seas in search of bootable booty. That's the fantasy. The reality involves a lot of less-colorful words and phrases — such as *theft, liquidated damages, intellectual property, grand larceny, agency,* and *punitive damages.*

Software piracy is just a fancy way of saying *stealing software.* If you use copies of commercial software you got from a friend or colleague, you are breaking the law. If you pirate software on a company computer, not only are you breaking the law, but the company is breaking the law too. The particular laws being broken, the copyright laws, make software piracy potentially more dangerous to perpetrators than common theft, since there are criminal as well as civil penalties. Not only can you or your company be charged with a crime, but you can also be forced to pay often substantial damages to the firm whose software you've stolen. So considering damages, fines, and legal fees, that $300 you saved by using a copy of Excel can end up costing you and your company $10,000 or more. Oh, and it's likely to cost you your job too if you're the offending employee. For some reason, companies don't like to keep employees who cause legal problems and cost them large sums of money in damages and legal fees.

Why do people take the risks of pirating software? Some do it to save themselves or their company money, even though the potential penalties are far greater than the money saved. Some do it to try out software that they later buy. Some do it because it's so easy, since almost all Mac business software is not copy-protected. Some do it out of ignorance because they don't know it's wrong, while a few do it for a thrill because they *do* know it's wrong. Whatever the motivation, the facts are that software piracy is wrong, it is illegal, and it can cause you and your company trouble you don't want or need.

For individuals, the solution to the piracy problem is simple: Don't do it. If you use only software that you've paid for, you won't break the law or expose your company or yourself to danger. If you have any software on your hard disk that you didn't acquire legitimately, erase it now and go out and buy a legal copy.

For managers, software piracy is a thornier problem. The first step is education. You must make — and enforce — an antipiracy policy and ensure that your employees understand that software piracy is illegal and will not be tolerated. If you're going to make it a firing offense, make sure employees know that they can be terminated for copying software.

Enforcement raises several problems. How do you police your employees to make sure they are complying with your antipiracy directives? A financial-service company in New York has a team of auditors who inspect employees' hard disks looking for pirated software and erasing it when it is uncovered. Should an employee try to hide pirated software by encrypting it or otherwise disguising it, the auditors are authorized to reformat the hard disk, and the employee is subject to termination. That is a no-nonsense antipiracy program with a strong enforcement aspect. Employees quickly learn that the company is serious about its antipiracy stance and isn't just giving it lip service. Companies may devise a less intrusive approach to enforcement, but they have to be willing to back up their antipiracy policy and follow through with appropriate and consistent penalties for its violation.

The one drawback to a strong antipiracy stance is immediate expenses (as opposed to long-term expenses such as legal fees, fines, and damages). Your software budget may have to be increased. You also should allocate funds in your budget for buying trial copies of software so employees aren't forced to use creative strategies such as piracy to try out programs. Check with the publishers of often-requested software to see if they offer site licenses that can save you money. With a site license, you pay one fee for the right to use as many copies of the software as you have computers in your business. Many software publishers offer such programs, especially if their software is the kind that needs to run on many machines to be useful (such as electronic-mail software). The larger your installation, the more money you can save with site licensing.

Software piracy is a serious problem. It's bad for software publishers, some of whom go out of business even though their

You should allocate funds in your budget for buying trial copies of software so employees won't use creative strategies such as piracy.



By Robert R. Wiggins

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products are widely used (illegally). It's bad for programmers, who make less money and are less inclined to follow up with new versions and new products if they think their chances of financial reward are low. It's even bad for pirates themselves, who often have their base nature rewarded and go unpunished, which makes their piracy even easier the next time and slowly erodes their moral values. But it's mainly bad for legitimate software purchasers, who may lose support for their programs when the publisher goes out of business or who might not get a new version because the programmer wasn't able to make enough money on the first one. So help stop software piracy now, starting with yourself and your company. You'll be doing a lot of good for a lot of people, including yourself.

Software pirates often go unpunished, which makes their piracy even easier the next time and slowly erodes their moral values.

Pinstripe Picks

Here are some of the most-pirated products for the Mac. Check to see if you're using any of these products without having paid for all your copies, and either pay for them or erase them.

Pyro! (Fifth Generation). Most everyone loves the fireworks of this screen saver, but not everyone pays for it.

Findswell (Working Software). This utility lets you find things when you need to the most: when the Open dialog box is confronting you. But it isn't part of Apple's system software, as some people seem to think.

MacWrite II and **MacPaint 2.0** (Claris). Yes, earlier versions of these programs were free, but the latest ones are not. When Apple got out of the software business, Claris brought out the new, improved, and more expensive versions.

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JIM SEYMOUR

The Smart Type

During the last year, and especially during the last few months, we've seen an explosion of new fonts from new sources for PostScript printers connected to Macs. Last month I looked at some of the changes in the market for PostScript-compatible fonts for LaserWriters and their ilk, such as the apparent cracking of Adobe's PostScript font-encryption scheme and the importance of the "hints" embedded in Adobe's fonts to improve the type's appearance at small point sizes. This month I'll offer some of my own hints about choosing and using Macintosh typefaces.

Typeface availability has long been an area in which the Mac outstrips DOS machines — and lately that gap has grown even wider. It doesn't seem likely to narrow in the foreseeable future either: Macs simply make more sense for the kind of precise work — such as typography — where subtle differences in details can make a big difference.

During this time of typographic upheaval, there's been a lot of confusion about such things as Adobe's much-misunderstood hinting system for getting better results in small type sizes. (Hints make a difference in 300-dpi printing of type sizes smaller than about 10 points and a *big* difference in sizes smaller than 6 or 7 points.)

A focus on what might be viewed as the arcana of Mac typography has clouded the more important issue for users: making intelligent and useful choices among the new fonts while avoiding unnecessary duplication or ugly documents that result from mismatched typefaces. So let's take a look at some of the emerging ground rules for buying Mac laser-printer fonts.

• **Don't mix typefaces with the same name from different vendors.** For example, avoid mixing Adobe's Futura with Bitstream's Futura. Each digital-type house's PostScript interpretation of these faces (even when the faces are tightly controlled standard fonts licensed from one of the major firms such as ITC) will vary, often just enough to give your finished piece an odd look.

• **Don't miss the newcomers in the Mac type business.** Although Adobe was the first player in the PostScript type business and still offers what is by far the widest range of typefaces, well translated for relatively low-resolution output devices such as 300-dpi LaserWriters, other vendors have useful typefaces too.

Bitstream eased into the Mac market earlier this year, releasing MacFontware packages from its huge library of digital typefaces. Bitstream is as big in the MS-DOS world as Adobe is in the Mac world and has been in the business of providing professional, well-designed type for some time. Both companies are now trying to take over the other's playing ground. If Bitstream succeeds in the Macintosh market with this first wave of releases, we can expect to see a lot more new faces for the Mac.

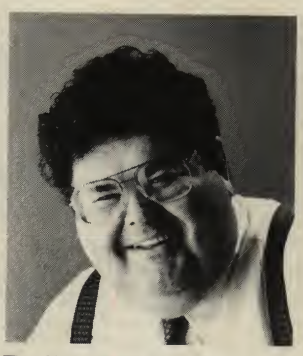
Image Club has many of the same faces (including ITC-licensed fonts) as Adobe, plus others that are unavailable elsewhere. In addition to selling fonts individually, Image Club also offers 600 typefaces on CD-ROM. If you don't want to pay for all of them at first, you can buy the CD-ROM and then selectively unlock faces as you need them, paying an additional sum each time. Adobe recognizes a good idea when it sees one: It now has more than 350 of its screen fonts added to the new CD-ROM Microsoft Office. I wouldn't be surprised to see Adobe follow up with a CD-ROM of its own.

Casady & Greene have several striking display-size faces — as does Olduvai — although those fonts usually don't work well in smaller body-copy sizes. And there are other small digital-type foundries, some offering only two or three typefaces, that have useful, attractive fonts for sale. It pays to look around.

• **Look for fonts especially designed for 300-dpi output.** Both Sumner Stone, the type-design guru at Adobe, and Matthew Carter, his counterpart at Bitstream, have designed new typefaces that look good within the resolution constraints of laser printers. By avoiding such touches as thin serifs and tight curves, the Stone and Carter series skirt the jaggies so common in type printed on LaserWriters.

I find the Stone series — which is made up of three basic families:

I cringe when I see a Mac owner's shelf full of mismatched onesy-twosy fonts.



By Jim Seymour

ILLUSTRATION: GREG CLARKE

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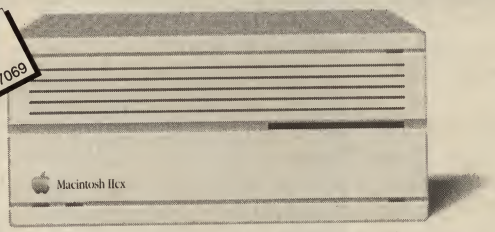
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Stone Informal, Stone Sans, and Stone Serif, with the usual Roman, bold, and italic variations in each family — among the most useful Mac fonts I own. Sometimes they look a bit heavy — an unavoidable problem with typefaces intentionally designed to avoid very thin strokes and curlicues — but as a group, they can form the core of a valuable extension to the famous 35 fonts embedded in ROM inside the LaserWriter Plus and its successors and clones.

- **Buy families of typefaces, not random fonts.** I cringe when I see a Mac owner's shelf full of mismatched onesy-twosy fonts. Concentrate your dollars on families of fonts that give you compatible stroke-width and weight variations from light through book, medium, demibold, bold, and black.

Look at font packages that extend the fonts inside your laser printer in the same way. For example, buying Helvetica Light and Helvetica Black can extend the usefulness of the Helvetica Regular in your LaserWriter.

- **Use weight variations supplied by vendors instead of relying on the Mac's internal type-style variations.** "Fattening up" a standard-weight font is rarely as effective as using a true demibold, bold, heavy, or black font drawn at that weight.
- **Install as many sizes of the screen fonts in your System file as your type vendor supplies.** And copy over Adobe's .AFM (Adobe Font Metric) files as well. Installing all the provided screen fonts gives you much better on-screen representations than you'll get by installing only the bare-minimum 10- and 12-point sizes.

And although not many programs presently use the data provided in .AFM files — MacWrite-format text files that tell programs the specific measurements of Adobe fonts so they can be kerned and otherwise manipulated with greater precision — more and more programs will begin using them during the next year.

Next month I'll wrap up this look at Mac PostScript typography with some suggestions on font-management and font-manipulation programs I use and recommend — from old favorites such as Suitcase II and MasterJuggler to little-known wonders such as the former shareware gem FontDisplay and great new products such as SmartArt.

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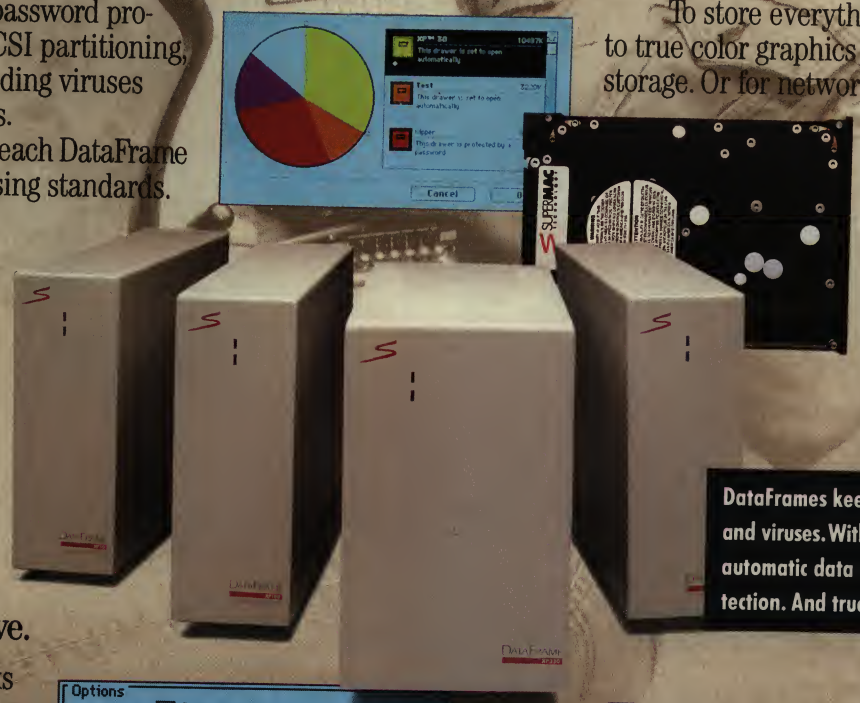
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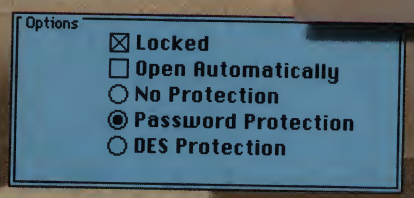
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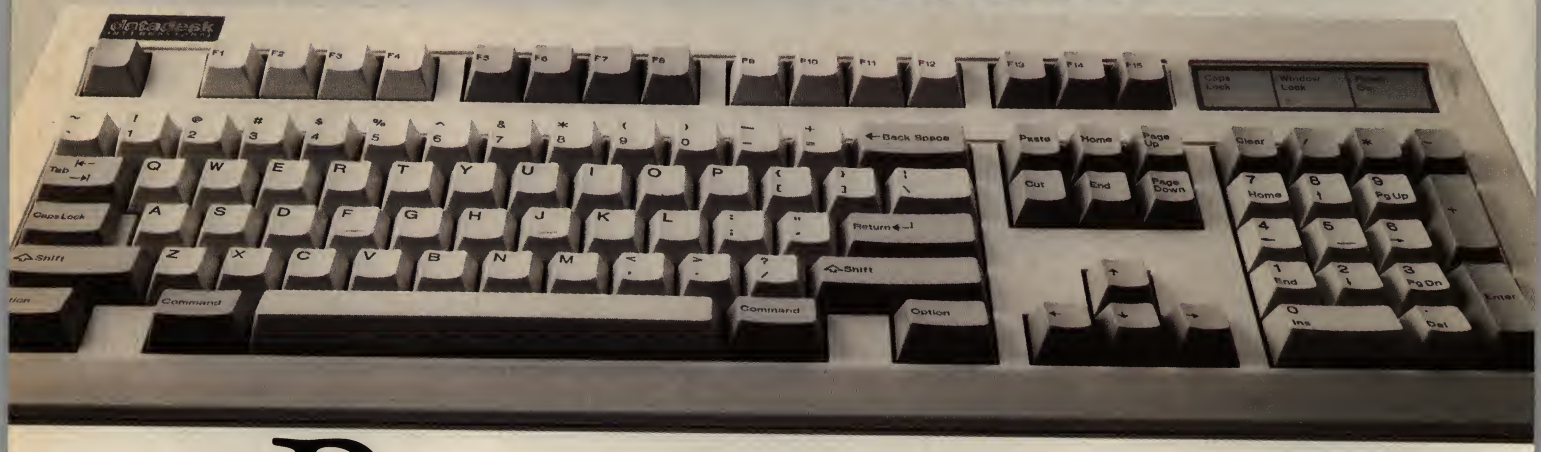
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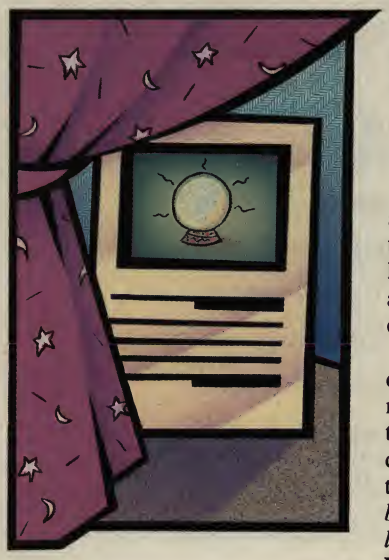
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LOUISE KOHL

Future Perfect

One of the most common characteristics of people who make their living around or through electronic technology — or those who read about it, hate it, or love it — is a virtual obsession with the future. No matter how wonderful the present state *is*, most of us barely take the time to appreciate it before panting after what it *could be*. Macintosh users are certainly no exception; in fact, we could be the rule. We tend to perceive ourselves as always sitting out there on the cutting edge with a clearer and more objective view than our less enlightened brethren. Our motto could easily be — to paraphrase a great American thinker, Walt Kelly's Pogo — "We have seen the future and it is us."

If we could leave it that vague, we too might be counted as great thinkers. However, there's a sometimes regrettable tendency to get more specific and say something such as, "We have seen the future and it is the paperless office."



This is an essay-question pop quiz; you may use both sides of the paper, and please do all calculations in the margin. *Whatever became of the paperless office, anyway?* For extra credit, describe any office that operates entirely — or even mostly — electronically.

Time's up. Please put down your pencils and close your test booklets.

The failure of the paperless office is not another "failure" of technology, the Macintosh, or any other computer to either realize its "real potential" or to live up to our expectations. It is a case, in that hackneyed phrase, of operator error. It is a problem of *use* rather than of function. As my grandaddy used to say, it's a poor workman who blames his tools.

One obstacle on the way to a paper-free environment is the somewhat archaic state of mailing-list programs. An informal survey has convinced me that none of the Mac programs do a merge-and-purge to eliminate duplicate names; or they *can* do it, but this feature is implemented in such a Byzantine way — often requiring the user to export/import between two or more programs — that no one bothers; or, simply, no one bothers. How many credit-card offers or Lillian Vernon catalogs do *you* need?

Given that experts are predicting that we are going to choke our planet with waste — much of it paper — by a time many of us can reasonably expect to still be around, and in view of the expense involved in duplication of effort, postage, and printing, merge-and-purge makes a lot of sense. But it just doesn't seem to make enough sense to offset the extra effort involved. It would be nice to think that the paperless office is still a possible scenario for our computerized future, but until — at minimum — some software developer fills a niche inadvertently left empty by Microsoft and Ashton-Tate, it doesn't seem likely.

So what do we replace it with? Many people are looking toward Steve Jobs' NeXT machine (or perhaps just toward Steve himself) to provide that answer. Fortune has grinned wryly in my direction lately, with the result that I've had an opportunity to play around with an up-and-running machine from NeXT.

Here's one person's idiosyncratic take: It looks good in an interior-decorating sort of way; distinguishing the NeXT interface from the Mac's seems like making a distinction without much difference. And it's slow. (There's some argument over this last perception. Most NeXT users — all ten of them — answer somewhat defensively, "It's faster than UNIX." Fine, but UNIX is not what it's going to be compared with.)

Having said this, I admit that there is much about the NeXT machine that reeks of the future. But it is not so much a question of the existing hardware or software or of new storage devices — it is a question of concepts.

NeXT has confirmed the "standard" of a graphical user interface (GUI), which bodes well for the proliferation of computers in general and a general upturn in intelligent use of computers in particular. To get to the point where a computer can be used with intelligence and some imagination, you have to *want* to use it. The GUI does much to guarantee this, as any Macintosh user can — and frequently does — tell you.

The failure of the paperless office is another case of operator error.

It also bodes well for the Macintosh and its industry. Apple was there first with the Macintosh, and if our developers and Apple stay on their toes, there's a very real possibility that they can stay out in front.

From this perspective, however, the best and most future-oriented aspect of the NeXT machine — and one that it would behoove other computer manufacturers (naming no names) to look at very closely — is the user interface.

NeXT also exploits a concept that is popping up throughout the Mac arena: object-oriented programming. An underlying virtue of object-oriented programming is that it puts real power into the hands of users rather than restricting it to a specially knowledgeable, small group. Software is what makes computers go and what



By Louise Kohl

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makes them useful. As long as software development remains the special province of a "priesthood," you have something roughly analogous to the relation of major oil companies to gas prices and availability. (Please take this in the spirit in which it is meant: as an analogy and in no way a moral judgment of programmers or developers — or oil companies.)

HyperCard was the first real step toward end-user programmability, and the NeXT machine is another. Nexpert Object, a powerful expert-system application for the Macintosh, incorporates object-oriented programming (see "The Expert Is In," September '89); Mainstay was one of the first Macintosh companies to recognize its importance with Visual Interactive Programming, and some development-oriented database programs, such as ACIUS' 4th Dimension and Odesta's Double Helix, have also picked up the cue.

Object-oriented programming tools transfer the power to develop applications from the software 'priesthood' to users.

If I'm right and this is a trend, we can all welcome it. And by making an easily accessible development tool part of the computer's architecture, NeXT has given the trend a lot of impetus.

If it continues, we will no longer have to wait for developers to fill empty, useful niches such as that of mailing-list managers with an efficient merge-and-purge function. That power (and responsibility) will be where it belongs: in the hands of the users.

Finales and StartUps

This is my last appearance as a columnist in *MacUser*. Look for me in a new-and-improved version of our StartUp section. And keep those cards and letters coming . . . .

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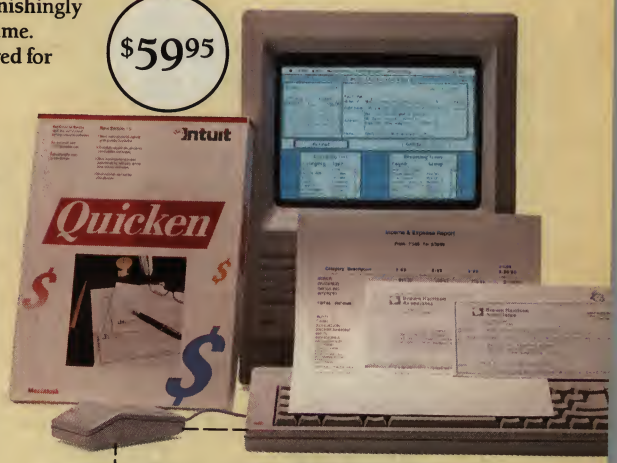
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START UP

Take a first look at Apple's new Mac IIci — a souped-up version of the IIcx that may be the best machine Apple has ever produced. In this month's reviews, SuperCard and Plus face off, and QuickMail gets a quick start on its E-mail competitors. If you deal with money, check out our review of atOnce! at once. And if you want to save money, consider investing in one of the three hard drives we tested. BetaWatch has the scoop on about-to-be-released products, and Up to Date has the latest information on old favorites.

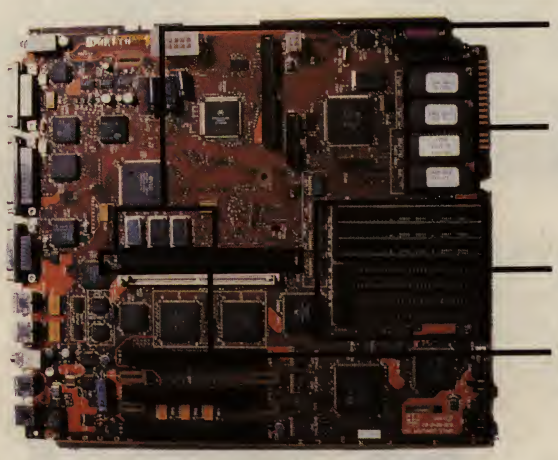
CONTENTS

Plus and SuperCard 60
QuickMail 62
WordMaker 67
atOnce! 68
Streamline 70
Star Time/ VideoShow 80
Drawing Table 82
Three Budget Hard Drives 87

EDITED BY RUSSELL ITO

Macintosh IIci:
New Speed Champ





On-board video circuitry produces 8-bit color video without a card.

The IIci's 512K ROM, the biggest and most sophisticated Apple Computer has ever built, includes 32-bit QuickDraw.

The IIci's 80-nanosecond RAM lets it use main memory as a video-screen buffer.

The Processor Direct slot makes it possible to install a cache card without using a NuBus slot.

In the realm of speed, there's quick and there's *fast*. The Macintosh IIcx was fast, but a new version called the Macintosh IIci renders its predecessor merely quick. At 25 megahertz, the new CPU (due to have been released in September) makes the rest in the Mac line look as if they were operating in geologic time.

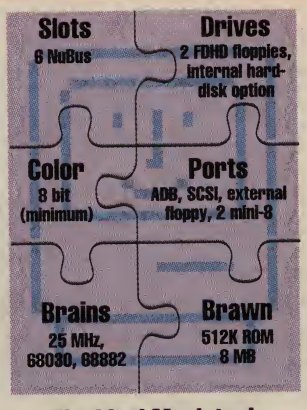
In addition to its 67-percent clock-speed increase over the IIcx, the Macintosh IIci offers a 120-pin Processor Direct slot that accommodates static-RAM–cache cards, boosting its performance even higher. A prerelease IIci equipped with a prototype cache card completed a suite of benchmark tests an average of 60 percent faster than a stock IIcx. Without the cache card, the IIci was still 38 percent faster than a IIcx (see "Macintosh IIci Benchmarks" chart). Cache cards are expected to be available from third-party sources when the IIci is released; Apple remains secretive about plans regarding a cache card but acknowledges that it's working on one.

The IIci also achieves new levels of functionality. The motherboard's surface-mount technology lets the IIci's 8-bit color-video circuitry be mounted directly on the logic board, driving either of Apple's 13-inch color monitors as well as its full-page display, from a built-in video port. With its on-board video, the IIci offers three NuBus expansion slots. The IIci's 80-nanosecond RAM chips let it use main RAM for screen display, eliminating the

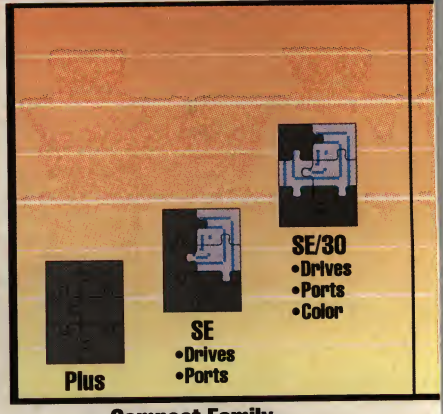
PHOTOGRAPHY: PETER ALAN GOULD

The ideal Macintosh would have the best of everything — from a full complement of six NuBus slots, I/O ports, options for internal and external hard-disk drives and FDHD floppies, to a top-speed CPU, at least 8 megabytes of RAM, and the new 512K ROMs. No one machine has it all — although the IIci comes close.

The Ascent of Mac: Comparing Macintosh Models



The Ideal Macintosh



Compact Family

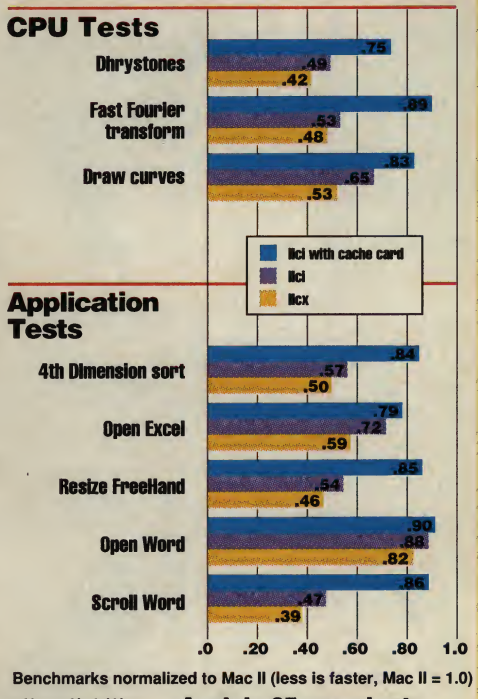
need for dedicated video RAM. But users choosing the IIci's standard 1-megabyte configuration will pay a price if they use the video in anything other than 1-bit mode — they'll use up to 320K of main memory for a video buffer.

The IIci features a newly designed 512K ROM on its mostly surface-mounted logic board. The ROM sports 32-bit QuickDraw, support for new hardware, and 32-bit–clean design — meaning support for up to 4 gigabytes of main memory as well as for future System compatibility. More than 150 yards of trace lines appear on the logic board, which is by far the most elegant Apple has ever offered. Five new application-specific integrated circuits (ASICs) — one of which (the NuBus Transceiver) replaces eight chips — lower the chip count while increasing the motherboard's reliability. The power supply, rated at 90 watts, is the same as the IIcx's.

The IIci's price hadn't been set at press time, but speculation was that it would cost about $1,000 more than a comparably outfitted IIcx. Apple has committed to an upgrade package for current IIcx owners, but the price was undetermined. If performance is what matters to you, however, you won't want to be without a IIci for long. **— John J. Anderson**

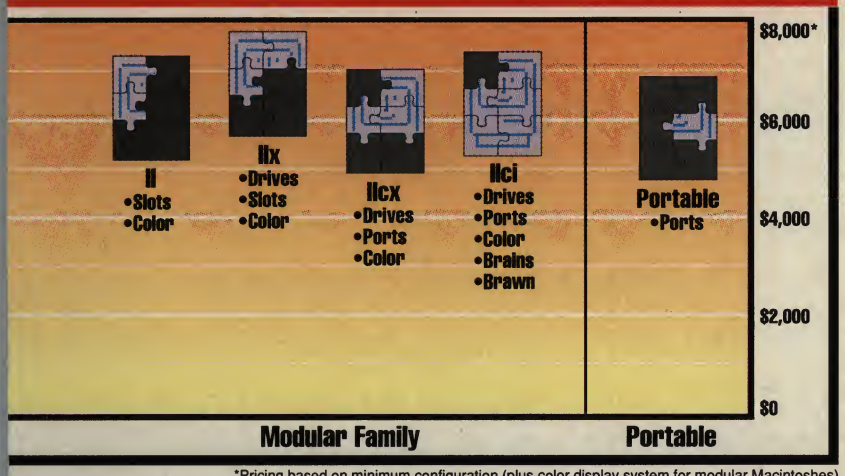
Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

Macintosh IIci Benchmarks



Benchmarks normalized to Mac II (less is faster, Mac II = 1.0)

Apple's 25-megahertz Mac IIci races past the former speed demon, the Mac IIcx. In our benchmark tests, the IIci was 38 percent faster, on average, than the IIcx.



MARK W. SWEENEY

*Pricing based on minimum configuration (plus color display system for modular Macintoshes).

NewsLine

MAC-NOST

Washington, DC — A change in the U.S. Commerce Department's export policy now permits American computer manufacturers to sell a broader range of computer technologies to Eastern-bloc nations. The change in policy allows Apple Computer to sell the Macintosh Plus and SE, in addition to the Apple II, to the Soviet bloc. Previously, Apple was restricted to Apple II sales. Although the Commerce Department explained the shift in policy by saying that similar computers (primarily IBM clones) from Asia were already available in these countries, the Pentagon has expressed concern that the release of this American computer technology may aid the Soviet military.

'LOOK AND FEEL' LIMITED

San Francisco, CA — In a move that may cause the end of Apple Computer's "look and feel" lawsuit against Microsoft and Hewlett-Packard, U.S. District Judge William Schwarzer has ruled that all but 11 of the 189 original violations claimed in Apple's lawsuit were covered under a 1985 licensing agreement between Microsoft and Apple. Of the remaining issues, the two most important cover overlapping windows and the use of some icons. Most observers consider this a major setback for Apple that virtually settles the case, but the company is still actively pursuing the remaining issues.

SE PRICES LOWERED

Cupertino, CA — In a move designed to boost sales of its low-end models, Apple has announced that the Macintosh SE will be upgraded and its price will be reduced. All new SEs will include a 1.4-megabyte FDHD SuperDrive instead of an 800K unit, and the list price will be reduced by $300. The basic SE now lists for $2,869. Apple will have an upgrade for current SE owners to add FDHD SuperDrives, but its price wasn't set at press time.

ASHTON-TATE SCALES BACK

Torrance, CA — Following a second-quarter loss of $19.8 million and the departure of its president, Luther Nussbaum, Ashton-Tate has laid off 15 percent of its workers. The move was part of an effort to return the company to profitability by the fourth quarter of 1989. None of Ashton-Tate's Mac products has been as successful as the company's MS-DOS dBASE products. While the future of A-T's Full Impact and FullWrite Professional programs seems secure, the future of dBASE Mac is less clear. Although A-T will continue to sell and support dBASE Mac, no upgrades are planned and the next A-T database product will probably be a dBASE IV-compatible package.

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Introducing software that thinks.

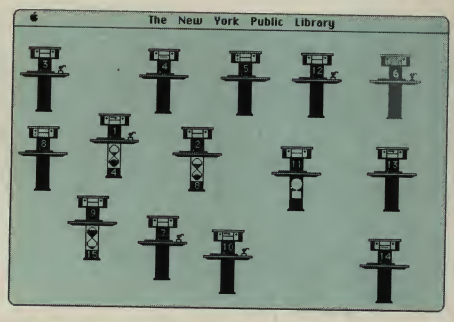
There has never been personal computer design and drafting software this powerful, this fast or this intuitive. Vellum thinks. Its radical new technology automatically pinpoints and aligns geometry as you draw. Built-in intelligence allows you to draw virtually freehand, yet set precise dimensions at any time. Finally, the days of complex commands and weeks of training are gone. Vellum has made industrial-strength design click on the Macintosh. For a demonstration see your Ashlar dealer or call (408) 746-3900.

ASHLAR
Software That Thinks™

Please circle 3 on reader service card.

Modern Carrels

In most libraries, the only things older than the reference librarian are the audio carrels, with their Edison turntables and Marconi amplifiers. So it's refreshing to see Current Designs' new listening stations, created for New York's Library and Museum for the Performing Arts at Lincoln Center. The 14 sleek listening stations, which will replace the library's existing units, all feature turntables and CD and cassette players connected to a touch-screen–equipped Mac running software that allows the librarian to monitor their use. Created as a custom project, the carrel software is being commercialized.





Using Current Designs' custom software (above), a librarian can monitor how these listening stations are being used.

The librarian can choose which carrels will be timed stations. At the expiration of a specified listening period, the Mac automatically fades the audio. The Mac also shows which component (turntable, CD, or cassette) is active and alerts the librarian if the patron is trying to steal the headphones or phono cartridge. At the end of each day, the program generates an itemized report on the use of each component at each station. Current Designs can tailor the system to meet the needs of other libraries. **— Russell Ito**

Current Designs, 115 W. 23rd St., New York, NY 10011; (212) 463-0795.

Apple Ventures

When Apple sold its stake in Adobe, we were curious about who else might be sharing the rainbow-fruit company's largess. Apple wouldn't provide any information on its publicly traded investments, but it gave us a rundown on its venture-capital activities.

Apple's initial venture-capital investments average from $500,000 to $1.5 million per financing round, reaching an average total investment of $3 million before the company goes public or is acquired. The five companies Apple named as venture-capital recipients were NetFrame Systems, Mirus, Echelon, Sybase, and Touch Communications.

Apple wouldn't specify how much money it had invested in each company. It is interesting that of the five, all but Mirus are involved in networking or connectivity issues, which suggests what area most interests Apple.

MUG Shots

Mac User-Group News

BBS OF THE MONTH If you collect anything from stamps to fruit-crate labels or merely want to begin collecting, the International Collectors' Network (ICN), a BBS for collectors, hobbyists, and pack rats, is the place to start.

You can find every possible collectibles organization on this board, which is maintained by sysop Harry Rosenfeld. The real treasure is a list of more than 150 organizations (with addresses and phone numbers) that specialize in collectibles, from the American Air Mail Society to the Winchester Arms Collectible Association.

You can also find a list of unique bulletin boards, books, and magazines on collectibles as well as collectibles news and discounts. As a member, you can place a free ad on the board. ICN, which is free, operates 24 hours a day, and you can access it at 300 to 2,400 bps. International Collectors' Network, P.O. Box 88703, Los Angeles, CA 90009. The BBS number is (213) 204-0646.

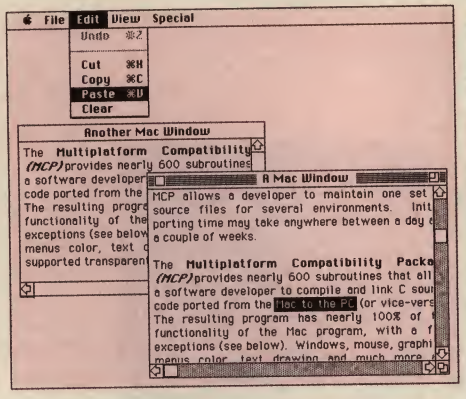
MUG OF THE MONTH LIMac (a Long Island MUG) has a HyperCard Special Interest Group (SIG) that produces one of the best HyperCard tutorials available. Each month SIG chair Kevin Moan prepares a lecture based on a 12-session course on HyperTalk. He prepares a HyperCard tutorial that explains and illustrates his lecture, using sound, animation, and links with other stacks or scripts. The result is the LIMacSTACK disk. Along with his lecture, the stack has news on LIMac and other notes, demonstrations of other stacks, and HyperCard tricks and tips. Kevin Moan, 1776 Browning St., Baldwin, NY 11510. LIMac, Long Island MUG, P.O. Box 518, Seaford, NY 11783.

FLASHWRITE is the best new shareware program to appear in the MUG community. It's a text-editor INIT that lets you store up to 32K per page, ten pages at a time, for a total of 3.2 megabytes. You can use different fonts, sizes, styles, and color. Justification is supported, as are cut, copy, and paste. A special Clipboard feature lets you edit text on the Clipboard — useful if you're on-line and need to drop someone a message. A box in the lower left of the editor box provides a word count. You can configure FlashWrite to launch on any key combination, use smart quotes, and change the creator type to save in your favorite word-processing–program format.

FlashWrite is available from Andrew Welch or on-line services such as GEnie for a $10 shareware fee. Andrew Welch, 29 Grey Locks Road, Wilton, CT 06897.

Don Rittner is editor of the MUG News Service. Send him MUG news at AppleLink PE: DRITTNER.

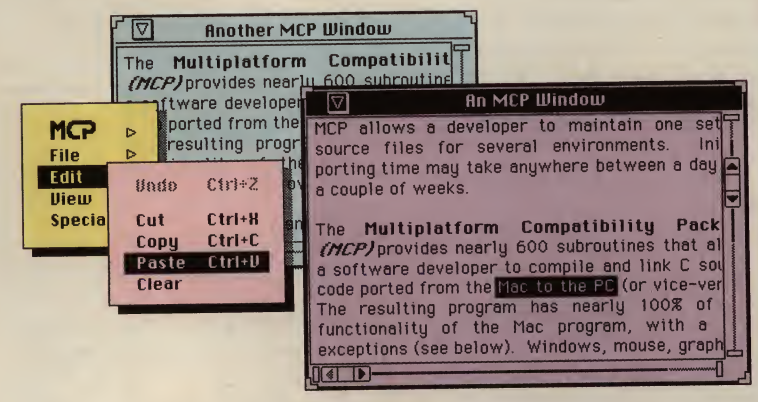
An OPEN LOOK to the Future



A year ago we told you about a remarkable programming utility from Screenplay Systems called the Macintosh Compatibility Package (MCP) that promised to convert any program written in C for the Mac into a DOS-compatible program that would look and function just like the Mac original (see New on the Menu, October '88). At the time, Screenplay Systems had planned to begin shipments around the time of our publication. That didn't happen. After receiving ambiguous signals from Apple over "look and feel" issues, Screenplay Systems went back to work; spun off a new division, Bawamba Software; and is about to issue a new version of MCP based on the Sun Microsystems-AT&T OPEN LOOK interface.

A whole new look and feel — Bawamba Software, a spin-off from Screenplay Systems, has now produced the Multiplatform Compatibility Package, which lets developers port source code written in Pascal or C directly to DOS or OS/2 with an AT&T OPEN LOOK interface.

In creating this new version, Bawamba has also changed what MCP stands for; it now means Multiplatform Compatibility Package, but the intent remains the same. MCP is a series of libraries that lets developers convert C or Pascal source code into a fully functional DOS- or OS/2-compatible version in a matter of weeks.



The OPEN LOOK interface is similar to the Mac's but differs in a few key respects: It uses pop-up instead of pull-down menus, and there are some differences in its approach to scroll bars and window sizing. On the other hand, it comes without lawyers. **— Russell Ito**

$995. Bawamba Software, 150 E. Olive Ave., Suite 305, Burbank, CA 91052; (818) 843-1627. ETA: Fall 1989.

Up to Date

Changes New and Noted

FREEHAND, from Aldus, has been bumped up to version 2.02. The new edition's added features include an option to view a redraw of each object in a drawing, a Transparent option that makes the white areas of 1-bit TIFF or paint images transparent (so pasting them into other applications won't obscure backgrounds), improved compatibility with PageMaker Color Extensions and QuarkXPress version 2.0, and improved 32-bit–color compatibility. $495; upgrade, free to registered owners of FreeHand 2.0. Aldus, 411 First Ave. S., Seattle, WA 98104; (206) 628-2320.

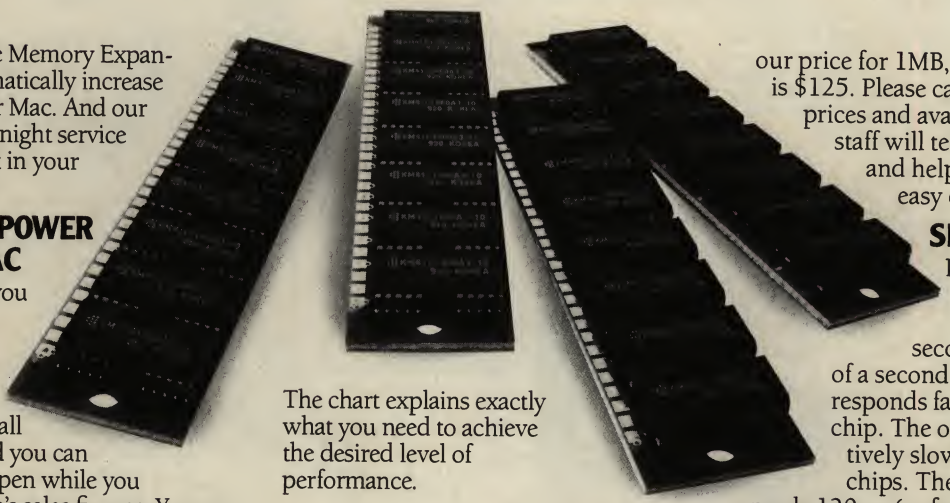
PHOTOMAC, Avalon Development Group's color-photo–retouching package, now features color stripping. Using PhotoMac 1.1, you can color-separate an entire page, including color photos, graphics, and type on a single set of negatives — no manual stripping or placing is required. PhotoMac 1.1's other improvements include improved speed for image resizing and separations, improved picture-sharpening algorithms, spooler support, and auto-tone adjustment for improved tonal balance. $795; upgrade, $90. Avalon Development Group, 1000 Massachusetts Ave., Cambridge, MA 02138; (617) 661-1405.

MATHEMATICA, Wolfram Research's colossal math processor, has received its first Mac upgrade, to version 1.2. Among the improvements are a completely variable 3-D viewpoint selector, the ability to save Mathematica graphics as Illustrator 88 files, an improved conversion option for turning bit maps into PostScript, the ability to perform computations in the background, and color selection with the standard Mac color wheel. $795; upgrade, $100 (free if purchased after April 30, 1989). Wolfram Research, P.O. Box 6059, Champaign, IL 61826; (217) 398-0700.

THINK C version 4.0, Symantec's latest incarnation of its C compiler, now includes object-oriented language extensions, a class library, and ANSI language and library compatibility. The THINK Class Library, written in Object C and provided in source form, is ideal both for learning object-oriented programming and for helping develop Mac applications faster. The THINK C 4.0 language has also been extended to include ANSI features such as prototype-style function declarations. THINK C version 4 isn't a C++ but provides the necessary functionality for object-oriented programming. $249; upgrade, $69 (free if purchased after July 1, 1989). Symantec, 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9600.

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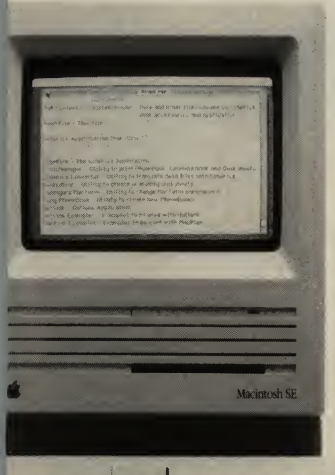


MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You don't even need a soldering iron. Just open your Mac, slide out the main circuit board, and plug in your memory card. Complete installation instructions are included with each memory kit.



WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@ $125).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, or SE30 to this amount of memory	**Do this: (install in multiples of four only)**
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just $15.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

*Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 100 ns Samsung kits is $125. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

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Do you need 80, 90 or 100 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

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The 4S is a 4 Meg memory expansion kit that allows you to get the maximum amount of memory in the Plus and SE or a 4 meg upgrade for the Mac SE/30, II, IIx or IIcx. The 4S uses state-of-the-art 1 mb, surface mount CMOS SIMMs and guarantees that today's memory investment will continue to work and grow with you. Step by step manual for easy installation. Dove offers a toll-free number for service and support. (memory) **$638.**

ACCESSORIES

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Toner Cartridges LaserWriter ..... 109.
Avery Labels (full line available)
Color Coded 3.5 Diskette ..... 4.
Laser 3.5 Diskettes ..... 29.
Laser File Folders ..... 6.
Laser Transparencies ..... 22.
Basic Needs, Inc.
HardTop Keyboard Covers ..... 15.
HardTop ImageWriter Covers ..... 17.
Keyboard Flip ..... 6.
Dust Covers - grey Nylon Ripstop
ImageWriter or LaserWriter ..... 12.
Mac Plus and keyboard ..... 11.
Mac SE and extd. or reg. keyboard 11.
Mac II and extd. keyboard ..... 12.
Universal Laser Printer Stand ..... 26.
Computer Friends, Inc.
MacInker *(IW & IW II)* ..... 41.
MacInker Black Ink ..... 3.
Curtis
Computer Tool Kit (52 pc.) ..... 49.
Curtis Clip ..... 6.
Disk Holder (holds 40) ..... 9.
Jewel Surge Suppressors ..... Call.
Ergotron
MacTilt-SE ..... 68.
MacTilt II-RGB ..... 75.
Goldstein & Blair
The Macintosh Bible ..... 20.

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Imageware II Carrying Case ..... 49.
Macinware IIcx Carrying Case ..... 89.
Macinware Mac II Carrying Case .... 99.
Macinware Plus Carrying Case ..... 64.
Macinware SE Carrying Case ..... 75.
Monitorware Apple RGB Case ..... 79.
Ribbons black ..... 4.
Ribbons color ..... 5.
Kalmar
Rolltop Teak disk holder 45 ..... 14.
Rolltop Teak disk holder 90 ..... 21.
Rolltop Teak disk holder 135 ..... 31.
Kensington
Anti-Glare Filter ..... 33.
Apple Security Kit ..... 34.
Mac II Stand w/Cable Kit ..... 65.
MasterPiece Mac II ..... 105.
PowerBacker 330 UPS Line ..... 269.
System Saver ..... 64.
MacWarehouse
Mouse pad ..... 7.
Mobius Products
Fanny Mac QT ..... 60.
SE Silencer ..... 39.



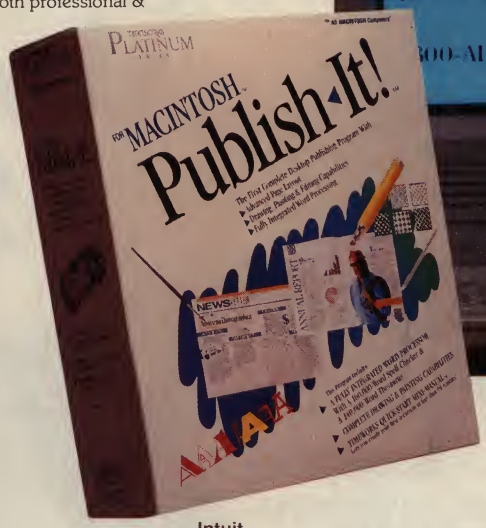
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Introducing MacPrint - the easy-to-use software utility that lets you use almost any Mac application on virtually any printer including HP LaserJet II and IID. MacPrint displays all your printer's fonts for true WYSIWYG performance. Prints text and graphics at your printer's maximum resolution. After the simple installation, it's completely transparent in operation. It's the cost effective print option for your Mac. (utilities) **$79.**

Orange Micro
Grappler L/Q or LS ..... 103.
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CompuDuster ..... 29.
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Mac Plus/SE Case (black)..... 59.

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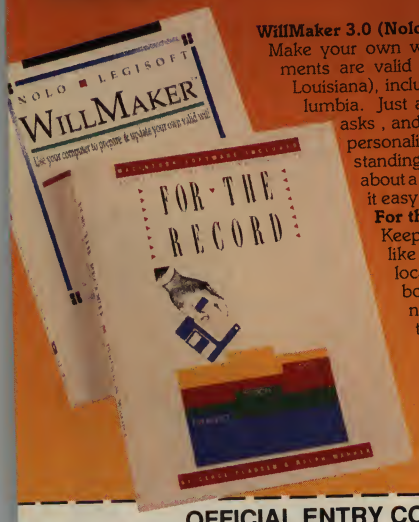
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Award winning SuperPaint combines the spontaneity of paint and the precision of Draw in one easy-to-use program. Powerful new features include AutoTrace™ automatically convert Paint graphics into Draw objects; a customizable airbrush; a freehand bezier tool to quickly sketch editable bezier curves; and Super Bits™ to edit bitmaps at any resolution. Mix fonts, styles and sizes in a single text block, freely rotate, scale, or slant text and graphics without sacrificing high-resolution output. (graphics) **$128.**

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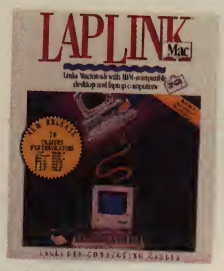
When you order by phone or mail, you are automatically entered in the drawing. You can also mail this coupon or call our contest entry line. 1-800-367-0787.

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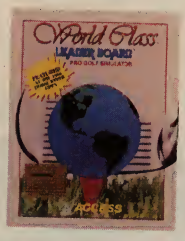
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Just connect the Lap-Link Mac universal cable to the PC and the Mac and you're moving files in both directions. Comes with translators, cable, 3.5" and 5.25" diskettes. (communications) **$83.**



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XTreeMac simplifies disk management by displaying disk contents within it's unique Directory Tree. It finds, launches and retrieves deleted files, even after you've emptied the trash. Copies or moves files from multiple drives simultaneously. Everything that finder does and more. (utilities) **$58.**



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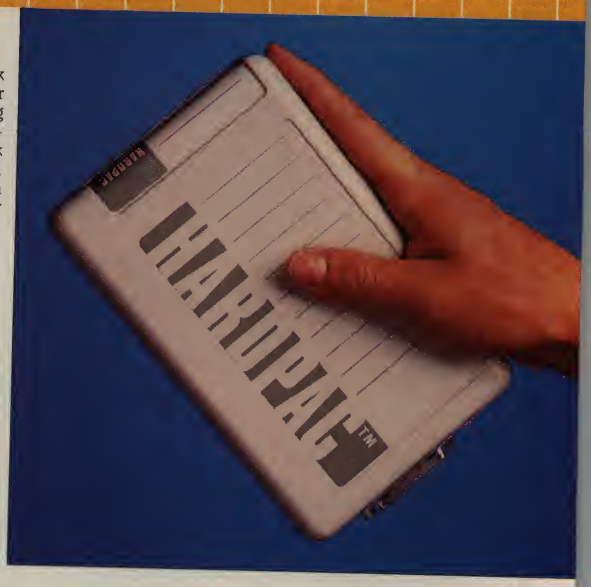
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Casady & Greene
QuickDEX ..... 31.
JAM Software
Smart Alarms & Appointment Diary . 49.
Smart Alarms (1 - 4 users) ..... 99.
Smart Alarms (5 - 8 users) ..... 149.
Smart Alarms (9 - 16 users) ..... 199.
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DAtabase ..... 72.
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MicroTV ..... Call.
Aldus
PageMaker 3.02 ..... 389.
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Springboard Publisher II ..... 109.
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MacStack 20 Meg ..... 529.
MacStack 30 Meg ..... 545.
MacStack 45 Meg ..... 625.
MacStack 60 Meg ..... 699.
MacStack 80 Meg ..... 799.
Cutting Edge
800K External Floppy Drive ..... 149.
SyQuest Removable 45Meg ..... 995.
Under the Mac 20 Meg ..... 439.
Under the Mac 30+ Meg ..... 499.
Under the Mac 45+ Meg ..... 549.
Under the Mac 65+ Meg ..... 629.
Under the Mac 80+ Meg ..... 739.
Dayna Communications
Dayna File Single 360K (5 1/4") .... 529.
Dayna File Dual 360K & 1.44M .... 669.
Dolphin Systems Tech
Integra 20 Meg ..... 545.
Integra 30 Meg ..... 595.
Integra 40 Meg ..... 765.
Integra 60 Meg ..... 815.
Integra 80 Meg ..... 1175.
Flipper 150 Meg Tape Backup .... 1439.
Flipper Removable 44 Meg ..... 1139.
Kennect Technology
Drive 2.4 ..... 359.
Rapport ..... 219.
Mobius
MultiScreen Video Card ..... 315.
PCPC
MacBottom Hard Drives ..... Call.
Peripheral Land, Inc.
Infinity Turbo 40 Meg ..... 1119.
Turbo Floppy 1.4 ..... 359.
Quantum
Quantum 40 MB Raw Drive ..... 545.
Quantum 80 MB Raw Drive ..... 869.

EDUCATIONAL PERSONAL

BrightStar
Alphabet Blocks 3.01 ..... 30.
Talking Tiles ..... 27.
Bootware Software
ResumeWriter Pro ..... 60.
Davidson
Math Blaster ..... 27.
Speed Reader II ..... 36.
First Byte
The Dinosaur Discovery Kit ..... 27.
The Puzzle Storybook ..... 27.
The Rhyming Notebook ..... 27.
Fair Tide Technologies
Navigate! mono ..... 199.
Great Wave
KidsTime 1.2 ..... 26.
NumberMaze ..... 26.
Learning Company
Reader Rabbit or Math Rabbit ..... 31.
MicroTech
Elementary Signer ..... 49.
Finger Speller ..... 29.
The Software Toolworks
Mavis Beacon Teaches Typing ..... 35.
Voice & Video Instruction Videos
HyperCard or Pagemaker 3.0 .... ea. 35.
Word 4.0 Video Tape ..... 35.

ENTERTAINMENT

Access Software, Inc.
World Class Leader Board ..... 27.
Artworx
Bridge 6.0 ..... 24.
Daily Double Horse Racing ..... 19.
GrailQuest ..... 19.

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Pamper your Mac with a Targus carrying case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. (accessories) **$75.** Full Targus Macintosh line some available in black, blue, burgundy, and platinum.



MORE FOR YOUR MONEY...

Maxell
DS/DD (box of 10) ..... 19.
Peripheral Land, Inc.
Turbo 40 Cartridge ..... 115.
Sony
DS/DD (box of 10) ..... 15.

BUSINESS AND PRESENTATION

A Lasting Impression
ResumExpert (word vers.) ..... 39.
Adobe Systems, Inc.
TrueForm SetUp ..... 229.
AEC Management Systems
FastTrack Schedule ..... 115.
Aldus
Persuasion 1.0 ..... 375.
Antic Software
FlexForm BusinessTemplates Vol 1 or Vol 2 ..... ea. 49.
Ashton-Tate
Full Impact ..... 249.
Avery
List & Mail ..... 79.
Claris
MacProject II ..... 379.
SmartForm Designer w/Assistant .. 299.
Cognition Technology
MacSMARTS PRO ..... 249.
Cricket (Computer Associates)
Cricket Graph 1.3 ..... 115.
Cricket Presents ..... 285.
DeltaPoint, Inc.
DeltaGraph ..... Call.



GOfer (Microlytics)
The ultimate text finder. A powerful software utility that searches, finds and retrieves text. Searches through countless files on your hard disk drive or floppy disks to find the text you need. A phrase, a fact, a note, a date. If you need it, GOfer finds it in seconds. You can automatically import the section of text into the document you're currently working in. You save hours searching through files. GOfer operates as a Macintosh desk accessory. (utilities) **$47.**

HyperPress Publishing
Intelligent Developer ..... 225.
Informix
WingZ ..... 259.
Microsoft
Excel 2.2 ..... 249.
The Microsoft Office ..... 499.
PowerPoint 2.1 ..... 249.
Works 2.0 ..... 185.
Power Up
Calendar Creator ..... 38.
FastForms! ..... 89.
Preferred Publishers
Direct Mail ..... 55.
ProPlus
Wall Street Investor ..... 469.
Satori
Bulk Mailer 3.2.3 ..... 78.
Softview
FormSet ..... 52.

SmartArt Effects (Emerald City Software)
Bring custom text and graphic effects to your favorite word processor, page layout or presentation program. It uses PostScript language inside your laser printer to preview precisely how your effect will print. Rotate text, and modify effects instantly. SmartArt I or III, for text effects or SmartArt II for Graphic Effects. You don't have to be an artist to look like one! Requires Mac SE, Plus or II and a PostScript laser printer. (desktop publishing) **ea. $85**



Symantec
More II 2.01 ..... 249.
Symmetry
KeyPlan ..... 339.
Synex
MacEnvelope 4.1 ..... 55.
MacEnvelope Plus ..... 149.
Vertical Solutions
FastLabel ..... 49.

CAD/CAE

Claris
ClarisCAD ..... 599.
Generic Software
Generic CADD Level 1 ..... 85.
Symbols Libraries available ..... Call.
Graphsoft
Blueprint ..... 349.
MiniCad Plus ..... 519.
Innovative Data
MacDraft ..... 144.
Dreams ..... 269.
I.S.I.
Precision ..... 399.
Strata
StrataVision 3D ..... Call.

COMMUNICATIONS

CE Software
In/Out (1 to 5 Users) ..... 129.
QuickMail 2.0 (1-10 Users) ..... 259.
CompuServe
CompuServe Navigator 3.0 ..... 45.
CompuServe Subscription Kit 9.95
DataVIZ
MacLink Plus w/Cable 4.1 ..... 139.
MacLink Plus/Translators 4.1 ..... 115.
Dow Jones
News/Retrieval Membership ..... 24.

FreeSoft
Red Ryder 10.3 ..... 52.
Hayes
Smartcom II 3.1 ..... 88.
Infosphere
Liaison ..... 179.
InSignia Solutions
Soft PC (Mac II) ..... 249.
MetaComet
AccuWeather Forecaster ..... 58.
Prometheus
Acknowledge ..... 289.
Macknowledge ..... 149.
Software Ventures
Microphone II v.3.0 ..... 219.
Synergy
Versa Term Pro 3.0 ..... 175.
Traveling Software
Lap-Link ..... 83.

DATABASE SOFTWARE

Acius
4th Dimension 2.0 ..... 549.
AEC Management Systems
AEC Information Manager ..... 415.
Claris
FileMaker II ..... 229.
Fox Software
FoxBASE+/Mac ..... 255.
FoxBASE+/Mac MultiUser ..... 355.
FoxBASE+/Mac Runtime ..... 155.
Microsoft
File 2.0 ..... 125.
Odesta
Double Helix III ..... 349.
GeoQuery ..... 199.
ProVUE
Panorama ..... 205.

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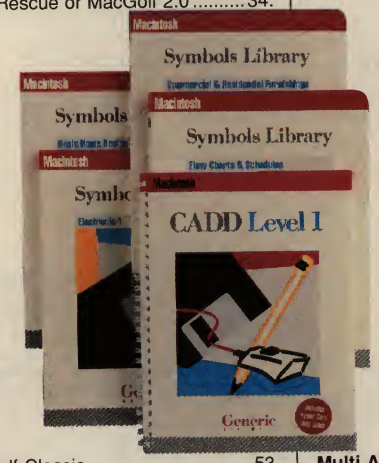
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WordMaker 4.0 (New Horizons)
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Broderbund
Ancient Art of War At Sea ..... 27.
Shufflepuck Cafe ..... 24.
Where in the World is Carmen ..... 27.
Bullseye
Ferrari Grand Prix or P51 ..... ea 32.
Fokker Tri-plane ..... 29.
Centron Software, Inc.
BlackJack or CrapsMaster ..... ea 27.
CasinoMaster *(5 pack)* ..... 49.
Discovery Software
Arkanoid ..... 26.
Electronic Arts
Chuck Yeager Adv. Flight Trainer ... 32.
Miles Computing
Fool's Errand ..... 32.
Puzzle Gallery ..... 27.
Mindscape
Balance of Power, Deja Vu ..... ea. 30.
The Colony or Gauntlet ..... 30.
Nemesis
Go Master ..... 49.
Joseki Tutor ..... 30.
PCAI/XOR
Lunar Rescue or MacGolf 2.0 ..... 34.



Generic CADD Level 1 (Generic Software)
Easy to learn and use. Drawing tools give you true CAD capabilities, including 256 layers, floating point precision and Bezier curves, NEW FEATURES include snap-to-grid, direct PICT file support. Symbol libraries also available. Now for a limited time, purchase a GENERIC CADD from MACWAREHOUSE and get a free symbols library, send a proof of purchase along with your choice of library to Generic Software.(please reference Nov. ad.) Offer expires 1/1/90
(cad/cae) **$85**



RoadRacer (XOR Corp.)
Drive a high-performance 1965 Corvette through 5 environments from super-high speed desert flats to twisting mountain roads. Uses digitized sounds, with spectacular scenery, obstacles, and wild crashes, fly over hills around curves at up to 200 mph. Score points for fast, skillful driving by steering and accelerating with your mouse and using your keyboard for brakes and shifting. Each level is tougher than the last. With the most sophisticated high-speed graphics ever achieved on a personal computer. For use on the Macintosh II, Mac Plus & SE (entertainment) **$39.**

MacGolf Classic ..... 53.
Road Racer ..... 39.
NFL Challenge ..... 54.
Spectrum HoloByte
Falcon 2.0 ..... 31.
Tetris Color version ..... 24.
Springboard
Hidden Agenda ..... 36.
The Software Toolworks
Chessmaster 2100 ..... 32.
Life & Death ..... 32.
The Hunt for Red October ..... 32.

FONTS

Adobe
Adobe Type Manager ..... 59.
Fonts (full line avail.) ..... Call.
Forms and Schedules ..... 289.
Newsletters ..... 239.
Presentations ..... 289.
Textures, Fills, and Patterns ..... 139.
Altsys
Fontastic Plus 2.02 ..... 52.
The Art Importer 2.0 ..... 99.
Letraset
LetraStudio ..... 275.
LetraFonts *(various)* ..... ea. 69.
Tactic Software
ArtFonts Vol.I or 2 ..... 55.
Orange Micro
Alphabits ..... 69.

GRAPHICS AND DESIGN

3G Graphics
Images w/Impact
Graphics & Symbols 1 ..... 52.
Business 1 ..... 65.
Adobe
Illustrator 88 ..... 289.
Streamline ..... 229.
Aegis Development, Inc.
Showcase F/X ..... 199.
Aldus
Freehand 2.0 ..... 349.
Broderbund
Drawing Table ..... 75.
Casady & Greene
Vivid Impressions Vol. 1 ..... 67.
Claris
MacDraw II ..... 299.
MacPaint 2.0 ..... 99.
Cricket (Computer Associates)
Cricket Color Paint ..... 179.
Cricket Draw ..... 167.
Deneba
Canvas 2.0 ..... 169.
Dream Maker
Cliptures, Business Images ..... 85.
MacGallery ..... 27.
Electronic Arts
Studio/1 ..... 99.
Studio/8 ..... 299.
MacroMind
MacroMind Director ..... 449.
VideoWorks II ..... 175.
Miles
Mac The Knife (all volumes) ..... 39.
Mindscape
ZING ..... 125.
Multi Ad Services
ProArt: Bus., Sports or Holidays ea.95.
NuEquation
NuPaint ..... 89.
Paracomp
ModelShop ..... 399.
Swivel 3D ..... 289.
Select Micro Systems
MapMaker 4.0 ..... 245.
Silicon Beach
Digital Darkroom ..... 259.
Super 3D 2.0 ..... 325.
SuperPaint 2.0 ..... 128.
SuperMac
PixelPaint 2.0 ..... 229.



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The ideal mail list management system. Contains duplication elimination, various sorting capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements.(business) **$78.**

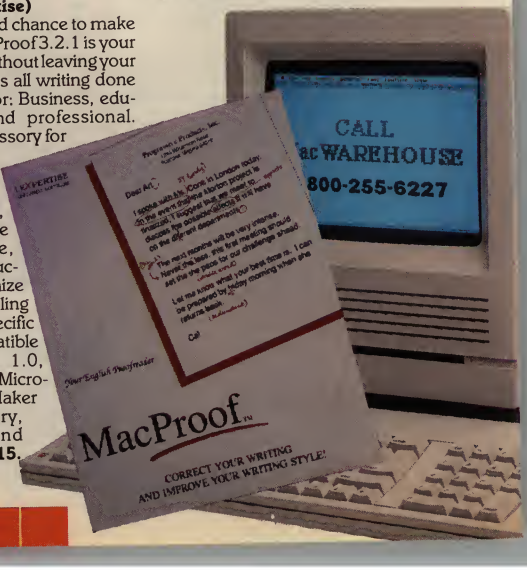


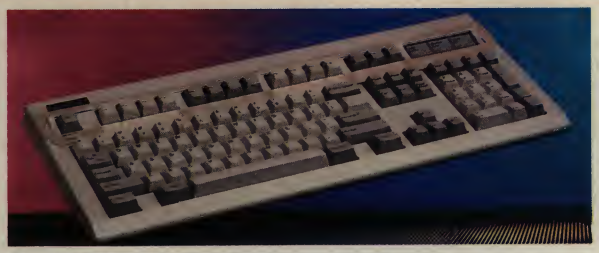
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Bridge 6.0 is a comprehensive contract or duplicate bridge - playing program which allows you and your computer partner to bid against two computer opponents and play out the hand. Ideal way for the novice to improve his or her game, and advanced player to get into a game without having to round up three additional players. (entertainment) **$24.**



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MacProof 3.2 (Lexpertise)
You'll never get a second chance to make a first impression! MacProof 3.2.1 is your English proofreader. Without leaving your document, it proofreads all writing done on your word processor: Business, educational, personal and professional. MacProof is a desk accessory for the Apple Macintosh Plus, SE, II, IIcx. Checks: mechanics (punctuation, spelling, capitalization, double words), Word usage, Writing style and Structure. You can customize the Usage and the Spelling dictionaries to your specific requirements. Compatible with MacWrite II V. 1.0, MacWrite V. 4.6 & 5.0, Microsoft Word 4.0, PageMaker 3.0, w/ 2mg memory, MindWrite V.1 and V.2.(spell checker) **$115.**





Mac-101 Keyboards (Data Desk International)
Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. International Versions also available. (input/output) **$139.**



Focal Point II
Personal information manager stores all those unrelated pieces of information that usually end up on loose scraps of paper. Time & Schedule Manager, Project & Task Manager, Clients & Vendors file, Expenses, and Phone Manager with an auto-dialer.(hyperware) **$117.**



Virex 2.1
Virus detection and treatment software. Intended for individuals that have unusually high risk of exposure to viral infections. Including Fortune 500 companies, and desktop publishing firms. Useful for those who use public domain software, or networks. (security) **$59.**



CanOpener
The information retrieval utility for the Mac. Search anywhere, and lets you retrieve just about anything; including text, pictures and sounds. It even locates text inside pictures, and gives you the whole picture! Anything retrieved can be stored in it's library, so the next time you need it, it's just a click away.(utility) **$65.**

PixelPaint Professional ..... 399.
Tactic Software
Art Clips ..... 51.
SoundClips ..... 49.
Zedcor
Deskpaint 2.0 ..... 65.

HARDWARE AND PERIPHERALS

Cambridge North America
Z88 Portable Computer ..... 699.
Z88 Pocket Modem ..... 225.
Z88 512K RAM Cartridge ..... 359.
The Complete PC
Page Scanner ..... 799.
DEST
Dest PC Scan Plus ..... SPECIAL 749.

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Dolphin Subsystems (Dolphin Systems Tech)
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General Computing Company
WriteMove Ink Jet Printer ..... 585.
Magnavox
Color Monitor 14" ..... 599.
Qume
Crystal Print Publisher ..... 3745.
Seikosha America
Seikosha Printer (dot-matrix) ..... 235.
Sharp
The Wizard ..... 249.
ThunderWare
LightningScan ..... 409.
ThunderScan 5.0 ..... 189.

HYPERWARE

Activision
Focal Point II ..... 117.
Reports for HyperCard ..... 69.
Bantam
Complete HyperCard Handbook .... 23.
Beacon Technologies
HyperBible International Version ... 179.
HyperBible King James Version .... 149.
BrainPower
ArchiText ..... 175.
Bright Star Technology
HyperAnimator 1.5.1 ..... 99.
ICOM Simulations
HyperTMON ..... 59.
MicroMaps
HyperAtlas ..... 59.
Power Up
HyperTutor ..... 29.

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Silicon Beach
SuperCard ..... 129.
Softstream International
HyperHit ..... 125.
Springboard
Family Matters ..... 28.
Symmetry
HyperDA 1.2 ..... 35.
TimeWorks
HyperWorks Organizer ..... 60.
Trendware Corporation
HyperTools #1 or #2 ..... ea. 52.
XCAL ..... 79.

INPUT/OUTPUT

Cutting Edge
CE-105 ADB Keyboard ..... 125.
DataDesk Intl.
Mac 101 Keyboards ..... 139.
Kensington
New Turbo Mouse ..... 109.
Koala
MacVision 2.0 ..... 219.
Kraft
ADB Joystick Premium III (SE&II) ... 51.
QuickStick ..... 39.
Kurta
IS/ADB Tablet 8 1/2 x 11 ..... 255.
Mouse Systems
A+ Mouse (512/Plus or SE/II) ..... Call.
Summagraphics
Bit Pad Plus ..... 325.

LANGUAGES

Digitalk, Inc.
Smalltalk/V MAC ..... 129.
Manx Software Systems
Aztec C or Unitools ..... ea. 65.
Microsoft.
QuickBasic ..... 65.
Shana Corporation
Inside Out ..... 369.
SmethersBarnes
Prototyper ..... 189.
Symantec
THINK'S C 4.0 ..... 165.
THINK'S Lightspeed Pascal ..... 89.
Zedcor
ZBasic 5.0 ..... 95.

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MaraThon Racer ..... 162.
MacSnap 2S ..... 319.
MacSnap 4S ..... 638.
MacSnap 8S ..... 1276.
MacSnap 524E ..... 187.
MacSnap 524S ..... 249.
MacSnap 548S ..... 479.

Acta Advantage (Symmetry)
With Acta, you can jot down your ideas whenever they occur. Later you can export the outline to a word processor or spreadsheet for more serious work. Acta outlines lists of things to do, items needed people on a project, appointments, name and address books, or any set of data you need to keep handy. Acta can sort, find, replace, mix fonts within topics, and accepts graphics too. (word processors) **$65.**





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MAcKNOWLEDGE (Prometheus Products, Inc.)
MAcKNOWLEDGE is the latest communications software available for your Macintosh. Icon based scripts provide instant access to all major online services with just the click of your mouse. The TAL scripting language provides all the capabilities for customizing and automating your own online sessions or the record function will watch your session and create an icon based script automatically. Also provides support of 9600 bps and MNP modems. (communications) **$149.**

MODEMS/FAX

Abaton
InterFax12/48 ..... 325.
Best Data Products
SmartOne 2400/1200 ..... 145.
Hayes
Smartmodem 1200 ..... 295.
Smartmodem 2400 ..... 429.
Smartmodem 9600 (V series) ..... 985.
Orchid Tech
MacFax ..... 448.
Prometheus
ProModem 2400 SE Int. ..... 209.
ProModem 2400M ..... 199.
Supra
Supra Modem 2400 ..... 139.
US Robotics
Courier 9600 Modem ..... 699.



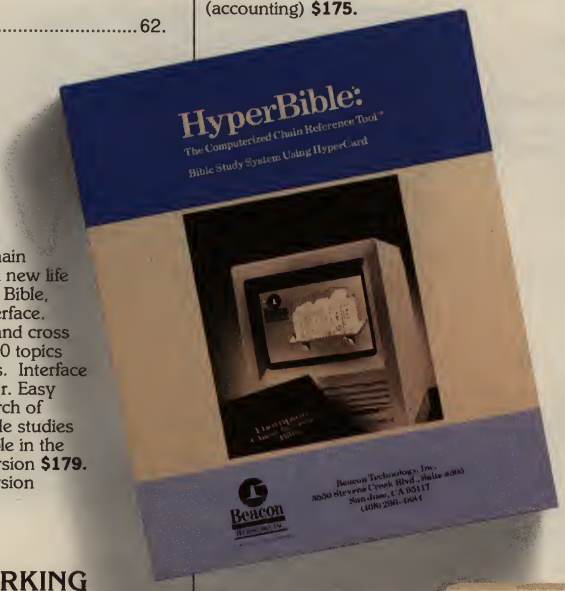
Polaroid Circular Polarizing Filter (Polaroid)
Improve contrast and reduce glare on virtually any computer monitor, it suppresses up to 99% of reflected light and is more effective than other kinds of filters for improving contrast. So you see clearly and with less effort. It fits directly over your Mac and attaches with velcro pads. With the purchase of a filter you get **FREE POLAROID SUNGLASSES**, a $16.95 value. (accessories) **$35.**

MUSIC AND SOUND

Altech
MIDI Interface ..... 59.
Bogas Productions
Super Studio Session 2.0 ..... 69.
Coda
Finale ..... 479.
MacDrums ..... 31.
Perceive ..... 50.
Electronic Arts
Deluxe Music Construction 2.5 ..... 85.
Esthetic Engineering
Music Mouse ..... 49.
Farallon Computing
MacRecorder (records sound) ..... 165.
Screen Recorder ..... 132.
First Byte
SmoothTalker ..... 33.
Great Wave
Concertware+MIDI 4.0 ..... 78.
HIP Software
Harmony Grid ..... 59.
Intelligent Music
OvalTune ..... 95.
Passport Designs
Master Tracks Pro 3.0 ..... 259.
NoteWriter ..... 189.
Passport MIDI Interface ..... 95.
Primera Software
Different Drummer ..... 59.
Repertoire
Music Publisher ..... 375.
Resonate
Listen 2.0 ..... 62.



Checkwriter (Aatrix)
Enter recurring transactions and it reminds you to write checks and enter deposits. Print your own ledgers, debits/credits and tax sheltered transactions. Unlimited number of checking accounts and transactions per account. Lets you design your own check and stub, and will write them too! **$37.**
Payroll Plus
Made for larger companies; will handle many employees, plus special accounting for restaurants, contractors, and commissioned sales people. Can manage payroll from up to 10 income sources. Prints checks, itemizes, accumulates O/T and can prorate sick / vacation pay. (accounting) **$175.**



HyperBible (Beacon Technology)
The Computerized Chain Reference Tool puts a new life into your study of the Bible, using hypercard's interface. Over 100,000 notes and cross references, Atlas, 7000 topics and Glossary of terms. Interface to any word processor. Easy word and phrase search of scripture. Ready made studies for meetings. Available in the New International Version **$179.** or the King James Version (hyperware) **$149.** Great gift items.

NETWORKING PRODUCTS

Connect Inc.
MacNet ..... 47.
Dove
FastNet SCSI ..... 749.
FastNet II ..... 565.
FastNet III ..... 375.
FastNet SE or SE/30 ..... ea. 375.
Farallon
Timbuktu 3.0 ..... 95.
Timbuktu Remote 1.0.1 ..... 195.
TrafficWatch ..... 135.
PhoneNET PLUS ..... 35.
PhoneNET Repeater ..... 325.
PhoneNET Star Controller ..... 1095.
Microcom Software
Carbon Copy Mac ..... 119.
Shiva
NetBridge ..... 349.
NetSerial X232 ..... 279.
TOPS
NetPrint ..... 119.
FlashBox ..... 125.
FlashCard ..... 159.
Repeater ..... 129.
Teleconnectors ..... 29.
TOPS ..... 145.
TOPS DOS ..... 115.

SECURITY AND VIRUS PROTECTION

ASD Software, Inc.
FileGuard 2.0 ..... 129.
TWINS ..... Call.
HJC Software, Inc.
Virex 2.1 ..... 59.
Kent Marsh
MacSafe or NightWatch ..... ea. 87.
QuickLock ..... 57.
Mainstay
AntiToxin ..... 65.
Symantec Corporation
S. A. M. ..... 69.

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BigThesaurus ..... 59.
Spelling Coach Pro ..... 115.
Electronic Arts
Thunder II ..... 52.
Lexpertise
MacProof 3.2.1 ..... 115.
Microlytics
Electronic Word Finder ..... 75.
Word Finder 2.0 ..... 36.
Sensible Software
BookEnds or Sensible Grammar ..... 53.



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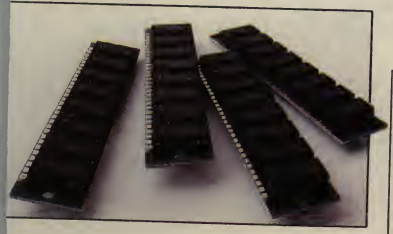
STATISTICAL ANALYSIS

Abacus Concepts
StatView II ..... 295.
StatView SE+Graphics ..... 225.
BrainPower
StatView 512+ (requires 512k) ..... 149.
D2 Software
MacSpin 2.0 ..... 189.
Odesta
Data Desk Professional ..... 289.
Paracomp
Milo ..... 159.
Select Micro Systems, Inc.
Exstatix ..... 219.
Wolfram Research
Mathematica (SE) ..... 450.

UTILITIES

Abbott Systems
CanOpener ..... 65.
Affinity
Tempo II ..... 79.
Aladdin
Programmer's Assistants ..... Call.
Shortcut ..... Call.
ALSoft
DiskExpress II ..... Call.
Font/DA Juggler ..... 42.

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MasterDisk ..... 49.
Master Juggler ..... 64.
Berkeley System Design, Inc.
Stepping Out II ..... 50.
CE Software
DiskTop 3.0.2 ..... 32.
QuicKeys 1.2 ..... 65.
Caere
OmniPage ..... 559.
Central Point Software
Copy II Mac (with MacTools) ..... 24.
PC Tools Deluxe For Mac ..... 46.
Dantz Development
Retrospect ..... 155.
Emerald City Software
Lasertalk 1.0 ..... 187.
Fifth Generation
FastBack II ..... 108.
PowerStation 2.5 ..... 35.
Pyro ..... 15.
Suitcase II ..... 45.
GO Technologies
MacTree Plus ..... 46.
ICOM Simulations
On Cue ..... 35.
Insight Development
MacPrint ..... 79.
Magic Software
AutoSave II ..... 29.
BackMatic ..... 50.
POWERICONS or POWERmenus ea. 39.
Mainstay
Capture 2.0 ..... 49.
Microlytics
GOfer ..... 47.
Olduvai
MultiClip ..... 51.
PCPC
HFS Backup 3.0 ..... 54.
Peripheral Land, Inc.
TurboBack ..... 49.
TurboCache or Turbo Spool ..... ea. 59.
TurboOptimizer ..... 25.
Preferred Publishers
Exposure ..... 55.
SuperMac
DiskFit 1.5 or SuperSpool 5.0 .... ea. 59.
Sentinel 2.0 ..... 89.
SuperLaserSpool 2.0 ..... 89.
Symantec Corporation
SUM II ..... 65.
Tactic Software
ClipShare ..... 139.
FontShare 2.0 ..... 149.
Williams & Macias
DiskFinder ..... 29.
myDiskLabeler ..... 34.
StickyBusiness 1.07 ..... 95.
XTree Company
XTree Mac ..... 58.

WORD PROCESSORS AND OUTLINERS

DeltaPoint, Inc.
MindWrite 2.1 ..... 95.
Ashton-Tate
FullWrite Professional ..... 259.
Claris
MacWrite II ..... 185.
Microsoft
Word 4 ..... 249.
Niles & Associates
End Note ..... 75.
Symmetry
Acta Advantage w/DA ..... 65.
T/Maker
WriteNow 2.0 ..... 109.
WordPerfect Corp.
WordPerfect ..... 189.
Working Software
QuickLetter ..... 73.

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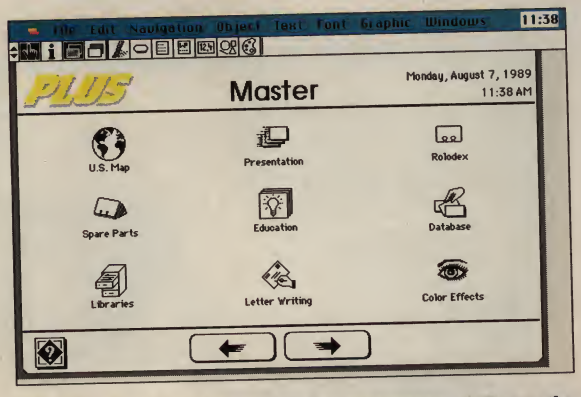
Plus and SuperCard

With new commands, hot effects, and color, two 'extensions' to HyperCard boldly take you where no ordinary stack has gone before.

It takes chutzpah to set out to improve on HyperCard when that means competing with the company that builds the machine your product runs on, and that company bundles its product with every machine, and the product's designers can violate the company's user-interface guidelines, but you can't, except where they have, and then you must.

Silicon Beach had the chutzpah. Early prerelease reports on SuperCard were ecstatic, saying it did everything that HyperCard should but didn't — adding color, full-screen windows, and more. Independent developers held their breath. Would increasingly litigious Apple sue Silicon Beach?

No. With grace and astute self-interest, Apple Computer encouraged and aided the development of HyperCard extensions, and Silicon Beach plowed ahead toward release.



Plus' Master Card brings you into an environment similar to the one that HyperCard's Home Card provides.

Meanwhile, in West Germany, a small team of programmers was working on Plus, another gutsy HyperCard enhancement. This summer, Format Software GmbH was able to secure American distribution through Olduvai, and the 1.1 releases of Plus and SuperCard were virtually in a dead heat.

WHAT THEY ARE Because HyperCard comes bundled with every new Macintosh, Plus and SuperCard must be thought of as extensions to HyperCard; otherwise, they'd be alternatives to it. Each provides essentially everything that HyperCard does, while adding the features at the top of nearly everyone's wish list: resizable cards, support for large screens and color, draw graphics, and more-flexible font styling in fields. You need these extensions if you want to produce snazzy presentations or rapidly develop mock-ups and prototypes — two of HyperCard's promises. They mark the difference between building stacks and creating things that look like real Macintosh applications. The most dramatic feature of these products is their support for 8-bit color: You can put up to 256 colors onto a card, and each card can have its own *clut* (color lookup table). You can paint in color, assign color to elements of draw objects, and assign foreground and background colors to buttons and to the card as a whole. Plus lets you assign multiple colors to text in a field when using its special word-processing fields, whereas you can't color field text in SuperCard. Plus has a command for cycling colors in the clut, which produces a dazzling kaleidoscopic effect (of limited usefulness). SuperCard allows a lot of control over inks, permitting object colors to complement, mask, or otherwise interact with the colors behind them.

Aside from providing color, SuperCard and Plus extend HyperCard chiefly by adding vocabulary to HyperTalk (the underlying programming language of HyperCard) and by adding new types of objects to the cards, buttons, fields, and backgrounds of a HyperCard stack.

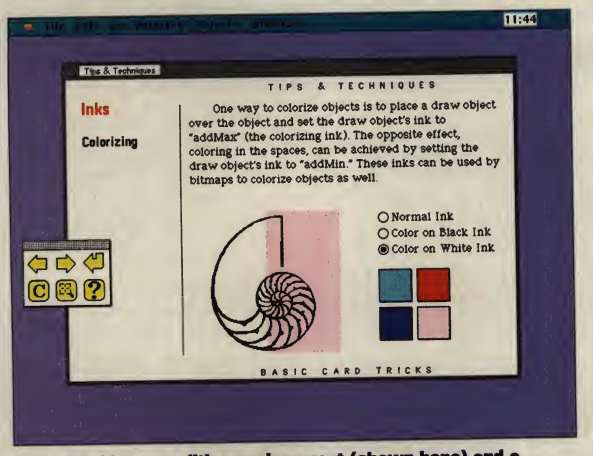
SuperCard's extended objects let you create an unlimited number of windows of various types, add menus, and create graphic objects. The graphic objects can be based on paint bit maps or draw-type graphics and can have scripts associated with them. An auto-trace tool makes it easy to automatically trace the polygonal outline of a bit-mapped image — from a HyperCard stack, for example—and turn it into a memory-efficient draw graphic. You can trace the graphic from either the outside or the inside. The latter method works in the same way as the paint-bucket tool does when it fills objects. Silicon Beach includes some tools for animating graphics, such as the capability to use a drawn polygon to specify a path for a graphic to follow as it moves.

Plus adds paint and draw objects as well as a choice of field types. It doesn't permit the creation of new windows or menus, but it does allow the resizing of the main window independently of the card size. The Plus database fields perform data validation, checking for valid date formats, for example; the word-processing fields allow richer text styling than do HyperCard's fields. SuperCard's fields permit more than one text style in a field but offer only one choice for alignment and vertical spacing — a halfway measure that facilitates, for example, italicizing words for emphasis but not centering a title over uncentered text.

Silicon Beach and Format/Olduvai both claim that the programming languages embedded in their products are supersets of HyperTalk, which is a fairly harmless exaggeration. Chiefly, the companies have maintained HyperTalk's syntax and vocabulary, extending them to control color, windows, graphic objects, and (in the case of SuperTalk) menus. Stacks imported from HyperCard may not run immediately under SuperCard or Plus, but a few changes such as deleting references to the Home Card (SuperCard doesn't have one) or replacing Open with Launch lets almost any stack do in SuperCard or Plus what it did under HyperCard. SuperCard and Plus both allow several script windows to be open simultaneously — a handy feature.

HyperTalk can be called a user language, with its English-like syntax and the ease with which you can put together useful programs. The language extensions of SuperCard and Plus are in this tradition, but both products also provide support for more-advanced development

work. You can import resources, including external commands, from stacks, although it would be naive to assume that every XCMD can make the transition. SuperCard has resource editing built in,



SuperCard has an editing environment (shown here) and a running environment. Developing SuperCard projects involves switching between these two environments.

allowing you to design icons, cursors, and cluts within its environment. Both products provide a method for sharing resources among stacks (projects), although experienced programmers may find the Plus libraries more straightforward than the SuperCard shared file. Both can produce stand-alone applications that can run without SuperCard or Plus (or HyperCard) present in the system. SuperCard's stand-alone facility comes in the box, whereas Olduvai charges $3 to cover shipping and handling for a copy of its run-time module.

HOW THEY WORK Anyone familiar with HyperCard should be immediately comfortable with Plus. The extensions hide in the product's depth, so you can begin using it as though it were HyperCard, learning new tricks as needed. There are some small quirks — for example, the Home Card is called the Master Card.

SuperCard extends HyperCard more fundamentally, which means you have more new ideas to assimilate at the outset. First, it separates editing and running into two environments: SuperEdit and SuperCard. This approach results in quite a different feel for the stack-development process. Second, there are no stacks. SuperCard creates projects, which contain windows, menus, and resources. The windows correspond most closely to HyperCard stacks because they contain the cards. Projects built with SuperCard are more complex than stacks because they are closer to real Macintosh applications. Silicon Beach put a lot of thought into access to the various levels of this complexity, with admirable results, but the edit-and-run cycle is inherently more cumbersome than HyperCard's direct development.

The SuperCard manual makes self-conscious reference to the time it takes to bake blueberry muffins. A less complimentary comparison would be to the time it takes a HyperCard stack to do its thing, and in this comparison, both SuperCard and Plus come out half-baked. The slower execution speed (compared with HyperCard's) is not surprising because these products do more than HyperCard. Color is demanding, richer text makes field updating slower, and testing was done on a (minimal for color) 2-megabyte Mac II. Some of the slowness of these products vanishes when you learn how to use them efficiently. HyperCard experience can actually get in the way here, as you'll have more to unlearn if you're a HyperCard expert.

Although you can import HyperCard stacks into either of these products, you generally get far superior performance from projects developed from scratch for Plus or SuperCard. HyperCard's bitmapped graphics consume much more memory than do the draw graphics that these products support — except where bit maps are required, such as in scanned images and subtle shading effects, draw graphics should be used. You can effectively exploit SuperCard's support of multiple windows and menus only by designing with these features in mind. And the variant field types that Plus supports also require rethinking how you organize information into fields.

SuperCard is very well designed software; Plus has more rough edges. I was able to crash both (particularly when pushing the memory limitations). The Plus manual and on-line documentation are poorly edited, although the manual makes fewer assumptions about HyperCard knowledge than the (significantly better and larger) SuperCard manual. Opening a new stack in Plus causes the image to jump annoyingly. Each product comes with a user manual, language reference, and quick-reference card.

For anyone drawn to HyperCard for its graphic and presentation capabilities, SuperCard is the logical next step. Silicon Beach learned a lot about graphics in developing SuperPaint and has put some of SuperPaint's graphics capability into SuperCard. The graphic objects, color handling, and animation effects are well handled.

Those attracted to HyperCard as a simple programming language, a flexible database engine, or an infinitely reconfigurable tool for simple text applications such as to-do lists and appointment calendars may find Plus a more logical extension. The manual, although unprofessional, is still better than the one Apple provides with HyperCard, and Plus adds color and specialized fields with less learning cost than SuperCard's.

I plan to use both products — and HyperCard as well.

— Michael Swaine

Get Info

Plus ★★★½

List Price: $199.
Published by: Olduvai Corp., 7520A Red Road, South Miami, FL 33143; (305) 665-0671.
Version: 1.1.
Requires: 1 megabyte; 2-megabyte Mac II for color.
Application Size: 548K.
Compatibility: Mac Plus or later; opens most HyperCard stacks without conversion.

SuperCard ★★★★

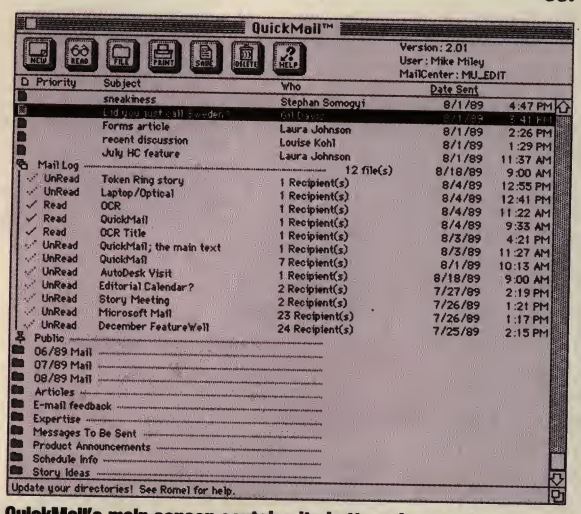
List Price: $199.
Published by: Silicon Beach Software, Inc., 9770 Carroll Center Road, Suite J, San Diego, CA 92126; (619) 695-6956.
Version: 1.1.
Requires: System 6.0.2; 750K; 1.5 megabytes and an 8-bit color card for color.
Application Size: 353K.
Compatibility: Mac Plus or later; opens most HyperCard stacks without conversion.

COMMUNICATIONS

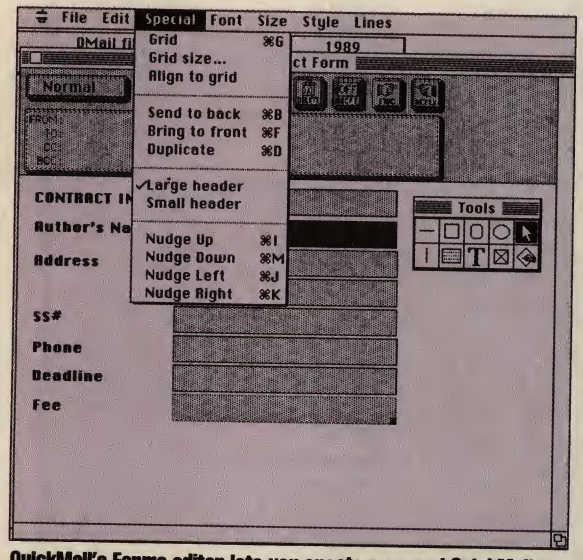
QuickMail

Packed with features, but still a little bit buggy, this is the current pick for Mac E-mail.

In the year or so that it's been available, CE Software's QuickMail has been a quirky contender for first place in the Mac E-mail race. QuickMail 1.0's set of features trounced the slicker InBox (from TOPS) and the leaner Intermail (now Microsoft Mail), but the program was buggy — an unacceptable trade-off.



QuickMail's main screen contains its buttons for message manipulation (top); the directory of incoming messages; the Mail Log, which tracks outgoing messages (open); the public bulletin board; and user-named folders for local storage of up to 100 messages per folder.



QuickMail's Forms editor lets you create personal QuickMail forms. It includes field, text, check-box, and drawing tools.

QuickMail 2.01 fixes many — but not all — of these problems. In the process of cleaning up its act, CE has also added more features and more gateways to other systems than any other E-mail package on the Mac has, strengthening its lead. But with cc:Mail and Microsoft Mail 2.0 being released as I write, the situation may change in the near future (see the "E-Mail Horizon" sidebar).

WHAT IT IS QuickMail is primarily a LAN-based messaging system that runs over AppleTalk. It can deliver messages and files locally — from client to client via a server or from server to server across routers — or store messages for a remote batch-send at a specified time via modem and phone or dedicated lines. Its server uses a file-sharing and -copying strategy that sets up a separate message folder for each user on a central Macintosh. (With this strategy, if a user sends a message to ten users, ten copies are replicated at the server, which results in stability at the expense of efficiency.)

The QuickMail server should be installed on a dedicated Mac (for stability), but you can run it in conjunction with an AppleShare or TOPS file server or (on smaller networks) on a Mac used as a workstation. A user DA and several Startup documents give you access to that Mac's MailCenter and to your messages. When someone sends you a message, you're notified, and the server holds it until you pick it up. You can specify how and how often you'd like to be notified. Messages can be sorted by Priority, Read/Unread, Subject, Sender, or Date Sent.

To create a message, you select a form from the pop-up menu under the New button. QuickMail includes QM Forms, a utility that lets you create custom message forms. Messages can be saved as text or in tab-delimited format for importing into other programs.

You choose message recipients by clicking on and dragging names from a directory of users on your server. You can add names to your directory from other servers and can create groups for collective sends.

Messages can be weighted for importance; for example, urgent messages can be set to always go through. You can also enclose a copy of your Clipboard's contents (text or graphics) or up to 16 files, although folders aren't supported. Users can print messages on any printer on the network. QuickMail also offers context-sensitive help to guide you through every function.

QuickMail's Conference mode lets you connect interactively with other users and exchange up to 480 characters per message while maintaining a transcript of your written conversation.

QuickMail connects to the larger world of wide-area networks and on-line services via QuickMail Remote and various software *bridges*, CE's misleading term for gateways. With QM Remote (or a standard telecom program), a user can upload and download messages. With CE's or third-party gateways, users can send batched messages at designated times to remote users, connecting via modem to commercial call-up services such as CompuServe, GEnie, MCI Mail, MacNET, and INet. CE's toolbox, Inside QuickMail, lets third-party programmers write other gateways to E-mail systems such as VINES Mail or UNIX Mail. Gateways to AppleLink, international Telex, and fax are in the works.

Since QuickMail's directories are stored at the user's station, any changes made at the server (such as a new or deleted user, a changed address, or a renamed or moved mail server) require tedious manual updating at each station.

Automatic directory propagation is essential for large mail networks.

HOW IT WORKS In spite of its improvements, QuickMail still has some bugs, such as occasionally losing contact with the mail server, an inconsistent interface (for example, the main directory is sorted by last name but the conference directory is sorted by first name), occasional double messages, scroll bars that sometimes won't show you the first line as you retreat through a message, and an Unsend that doesn't work across servers. QuickMail also gobbles up nearly 100K in RAM for each user.

Despite this, QuickMail does so many things well (and CE's tech support is so responsive) that I recommend it. There's plenty of room for improvement, but as of this writing, it's the best that's out there.

But whether or not it's the ultimate E-mail system is another question. In spite of its improvements, QuickMail still has bugs. Even though they're not fatal, a flawed E-mail system can seriously impair your productivity and increase your blood pressure. Nonetheless, while we continue to wait for Microsoft Mail 2.0 to ship, QuickMail is the one you should pick.

— Michael Miley

Get Info

QuickMail ⚡⚡⚡⚡

List Price: QuickMail, $69.95 (one user), $269.95 (five users), $399.95 (ten users); QM Remote, $49.95; Inside QuickMail, $50.
Published by: CE Software, 1854 Fuller Road, P.O. Box 65580, West Des Moines, IA 50265; (515) 224-1995.
Version: 2.01.
Requires: System 4.2 or later; 1 megabyte of RAM and hard disk required for server and recommended for all users.
Application Size: QM Administrator, 167K; QM Remote, 72K; QM Resources, 171K; QM Server, 41K; QM Forms, 86K; QuickINIT, 302K; plus assorted Help files. QuickMail DA, 98K in RAM.
Compatibility: Macintosh 512KE or later.

The E-Mail Horizon

As we went to press, two more E-mail systems were officially introduced: cc:Mail and Microsoft Mail 2.0. Both support PC and Mac coexistence, and neither replicates messages at the server, but their architectures use different database systems.

cc:Mail is the most popular E-mail system for the PC. Designed to run on top of any DOS, OS/2, or AFP-compatible file server (PCs only), cc:Mail has a store-and-forward architecture that is intended to be platform-independent: All "intelligence" resides at the workstation.

cc:Mail's features include up to 20 enclosed files with a message, and automatic graphics translation in any PC-to-Mac transfer (the reverse isn't available). Gateway support for IBM PROFS, EasyLink, MCI, and Sprint Telemail is also available.

The transfer of compound editable documents that contain text, graphics, and sound between Macs and PCs is cc:Mail's goal. But the current version is limited to transferring text and binary files only.

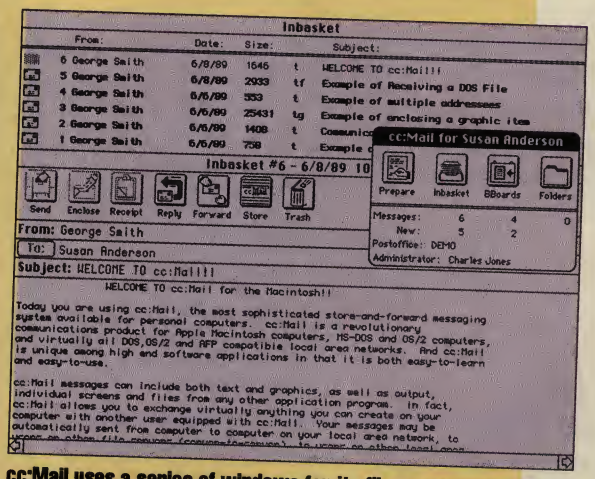
Microsoft Mail 2.0's store-and-forward architecture differs from both cc:Mail's and QuickMail's in that Mail is a true database: Most of its intelligence resides on the server.

The Mail server can reside on a Mac or a VAX but not a PC. Mail's features include custom forms, automatic data compression, keyboard loading of names, and automatic directory propagation. Gateways to AppleLink and MCI are included, and others (including X.400 and VMS Mail) are being developed. Mail also works with Microsoft Word and Excel, so messages can be sent from within those applications.

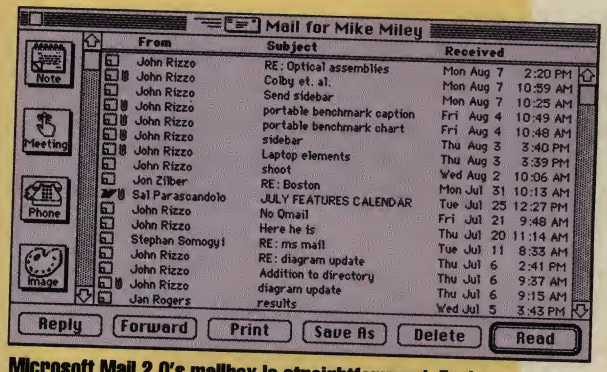
Mail's application integration also lets it extend far beyond the capabilities of conventional messaging packages. In combination with Excel macros, for example, Mail can be used as an automatic data-collection system that can place orders, check inventory, assemble a pick list, and update sales records.

cc:Mail for Macintosh, $495 (up to 25 users); cc:Mail Expand, $595 (first additional 75 users), $595 (next additional 100 users). Requires cc:Mail for DOS, $695. cc:Mail, 385 Sherman Ave., Palo Alto, CA 94306; (415) 321-0430.

Microsoft Mail 2.0, $395 (server), $125 per node (workstation), $1,495 (20 pack). Microsoft Corp., 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717; (206) 882-8080.



cc:Mail uses a series of windows for its file management. The three open windows are cc:Mail's "control box" for creating messages, for fetching them from the Inbasket or a bulletin board, or for storing them in a folder (the active window); the Inbasket for incoming mail (top); and a message with routing icons (bottom).



Microsoft Mail 2.0's mailbox is straightforward. Enclosures are marked with paper clips, and messages sent directly from Word or Excel are marked with the application's icon. The scroll bar on the left scrolls the available forms.

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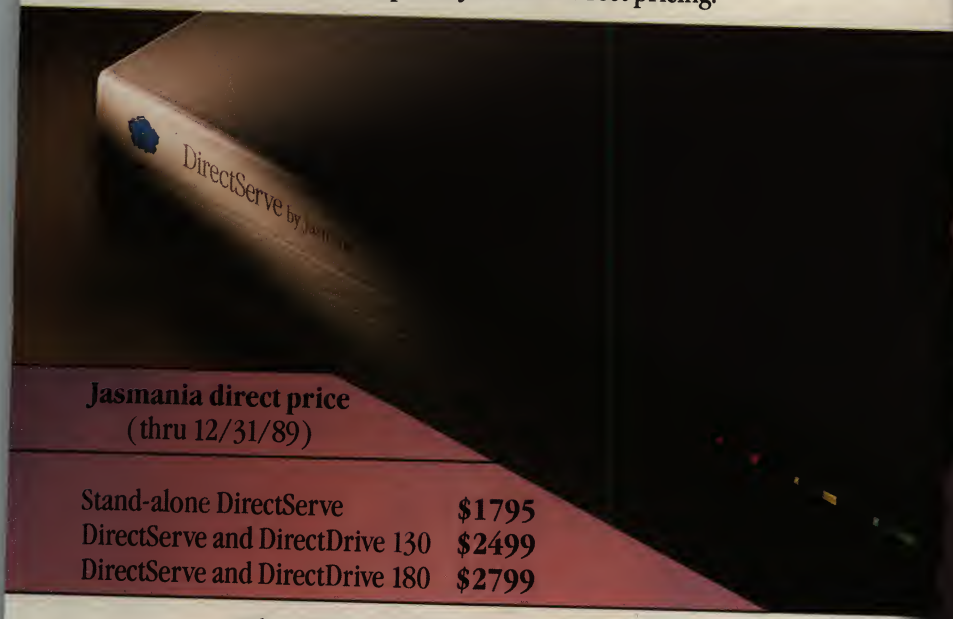
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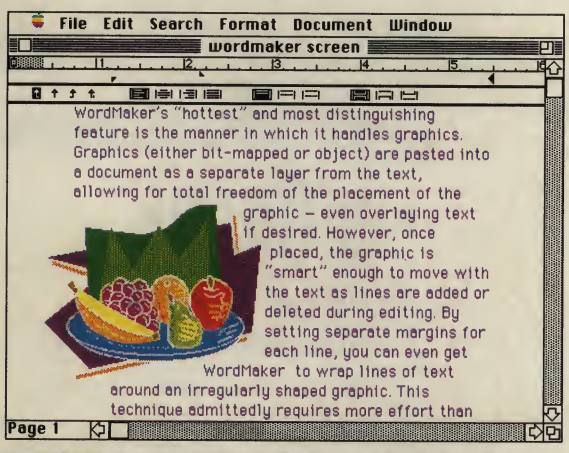
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WORD PROCESSING

WordMaker

An Amiga port tries to seize the empty MacWrite throne but comes up short.

For some users, the top-of-the-line word processors are more deadweight than heavyweight — cumbersome, expensive, and stuffed with superfluous features. What these users need is a leaner, less expensive, and easier-to-use word processor. Enter WordMaker, New Horizons Software's low-level to midlevel word processor, which first appeared as ProWrite on the Amiga more than a year ago.



WordMaker is a low-level to midlevel word processor that comes to the Mac from the Amiga. By keeping graphics and text in separate layers, it can wrap text around a graphic. With WordMaker's ruler, you can set tab types, margins, justification, and line spacing (maximum of double space) and specify whether to separate paragraphs with extra spaces.

WHAT IT IS MacWrite's upgrade to MacWrite II created a vacuum at the lower end of the Mac word-processing spectrum, so New Horizons rushed in with a package that resembles the original MacWrite. And based on its resemblance to the original Mac word processor, WordMaker is a winner. First, at $124.95, it is the least expensive of any word processor available. Second, it's as easy to use as Apple's MacWrite. Even Macintosh novices should be able to master it without difficulty. Last, it is lean — WordMaker's manual is only about 100 pages long, yet it clearly explains every feature of the program. The application itself is a mere 138K.

Despite this no-frills approach, WordMaker includes several significant enhancements. For starters, it can open up to eight documents simultaneously — beating MacWrite II by one. It can display invisible characters (spaces and return characters), has a mail-merge capability, lists word and character counts, supports color, and can even sort paragraphs alphabetically. It can save documents as "stationery" templates and allows you to customize the default settings for font and style. Finally, it employs a single ruler whose settings shift as the active paragraph changes, something that MacWrite added only with MacWrite II.

WordMaker's hottest and most distinguishing feature is the way it handles graphics. Graphics (whether they be bit-mapped or object-oriented) are pasted into a document as a layer separate from the text, which allows total freedom in their placement. You can even overlay a graphic with text. Because there's no way to send the graphic behind the text, however, your graphic should not contain too many solid-colored areas. Once placed, the graphic moves with the text as lines are added or deleted during editing. By setting separate margins for each line, you can even get WordMaker to wrap lines of text around an irregularly shaped graphic. This technique admittedly requires more effort than using the automated wrap-around feature of more expensive applications — but other programs in WordMaker's price range can't do it at all.

WordMaker includes keyboard command equivalents for most of its menu commands, and it throws in a Command-click combination that calls a pop-up menu containing its menu bar and menus. The WordMaker disk also includes a macro file (compatible with Apple's MacroMaker) that provides an easily editable additional set of keyboard command shortcuts. It isn't necessary to use these macros, but if you are already comfortable with MacroMaker, they are a worthwhile addition. WordMaker is also compatible with MultiFinder; several of its functions (such as its spelling checker) even operate in the background while you work with another application.

HOW IT WORKS Unfortunately, WordMaker is slow on 68000-based Macs. Even relatively slow typists can frequently get ahead of its display buffer. And its spelling checker is occasionally agonizingly slow at suggesting alternatives to misspelled words.

Overall, WordMaker is impressive and flexible. But to be successful, it must roundly beat its competition, especially T/Maker's WriteNow 2.0 and Claris' MacWrite II (see "Word Wrestlers," August '89). From this perspective, WordMaker offers too little too late.

Both WriteNow and MacWrite II have almost all the features of WordMaker and then some. WordMaker can't format in multiple columns or create footnotes. Compared with MacWrite II, WordMaker also has a much less extensive search-and-replace function and a more awkward mail-merge capability. Finally, WordMaker has the most limited file-import and -export capabilities: It can work only with text and MacWrite formats. Despite the added features of WordMaker's competitors, those programs are not significantly harder to learn. And

Get Info

WordMaker ★★★½

List Price: $124.95.
Published by: New Horizons Software, P.O. Box 43167, Austin, TX 78745; (512) 328-6650.
Version: 1.0.
Requires: System 4.1 or later; two 800K drives or hard-disk drive recommended.
Application Size: 138K.
Compatibility: Mac 512KE or later.

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though they are more expensive, they're still below the top price range of Macintosh word processors.

If you've been fairly happy with MacWrite but would like something a bit more powerful, then WordMaker is for you — provided you can put up with its slowness. It overcomes almost all of the original MacWrite's deficiencies at a bargain-basement price. But for a little extra money, you can get an even more powerful program that's almost as easy to use (WriteNow, for instance, lists for $70 more than WordMaker, but the difference in actual street price is more likely to be $25 or so). WordMaker is a good program — a year or two ago, I might have said it was a great program. Unfortunately, the current competition offers better values.

— Ted Landau

BUSINESS ACCOUNTING

atOnce!

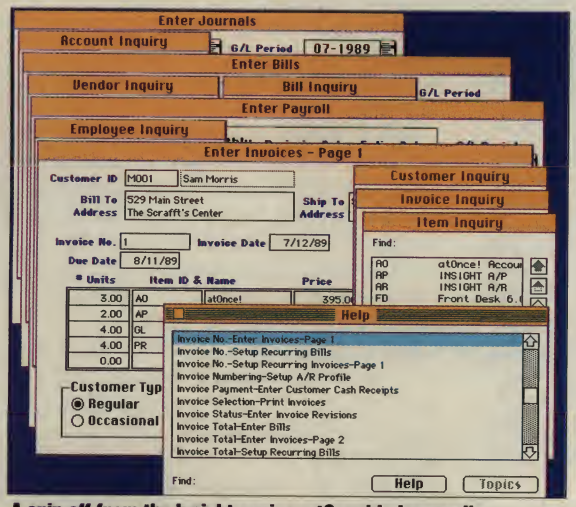
With an established accounting system for big businesses, Layered has now turned with equal success to smaller operations.

If your company offered one of the market's leading integrated accounting systems for high-transaction businesses, a logical product-expansion strategy would be to take what you'd learned and build a similar system for small businesses. That's exactly what Layered, the publisher of the Insight accounting series, has done with atOnce!, a direct challenger to Monogram's Business Sense (see Reviews, September '89) and Computer Associates' Simply Accounting (see "Accounting for Taste," April '89).

WHAT IT IS atOnce! is an integrated general-ledger, accounts-payable, accounts-receivable, and payroll system for small businesses. The system is designed to work in stand-alone mode for businesses with up to approximately $10 million in annual sales.

atOnce! achieves its integration through automatic posting routines — any infor-

mation entered into one of the modules is automatically reflected throughout the system. You can open many modules at once, so you can simultaneously enter invoices into accounts receivable and switch to accounts payable without closing out your receivables.



A spin-off from the Insight series, atOnce! is Layered's integrated accounting package for small businesses. Every window in every module can be open simultaneously, so any data entered into one module flows through the entire system.

The system offers the requisite minimum multilevel password protection for protecting the integrity of your business information. Output can be directed to the screen, to the printer, or to a print queue for larger batch-printing jobs.

A helpful feature in atOnce! is Inquire, which lets you keep lists of your general-ledger accounts, customers, invoices, bills, employees, and the like on your desktop as a reference guide outside the accounting system. The system is driven by an icon-based application palette that controls your navigation through the four modules.

In the general ledger, atOnce! offers a flexible fiscal calendar that can have 12 or 13 periods per fiscal year with up to 26 open periods stored on-line. Each period can have its own starting and ending date. The general ledger tracks actual versus budget performance for all income and expense accounts, and it is able to accommodate up to 20 customized checkbooks.

For account numbering, the general ledger can use user-definable account numbers of two to eight digits. The ledger can handle up to 100 departments and divisions, and it supports auto-reversing and recurring entries. In short, the general ledger does just about everything Insight does, but for a smaller business.

The general ledger includes a standard set of accounting reports as well as a custom report writer for creating tailored financial statements.

The accounts-receivable module uses the open-item or the balance-forward accounting method for the entire company or for a specific customer's account, as you choose. Automatic discount and sales-tax calculations are supported, as are flexible account-aging periods and recurring invoices. Each customer can have a unique alphanumeric customer ID. atOnce!'s accounts-receivable module supports custom invoice and statement forms through its intelligent formatting and printing system.

The accounts-payable module offers the same features as does the accounts-receivable module. In addition, atOnce!'s accounts-receivable module has a recording feature for handwritten checks, and it can also print checks. The two capabilities can be used in tandem. For small businesses, where cash flow is a concern, atOnce! has a powerful and flexible payment-selection function that helps manage disbursements.

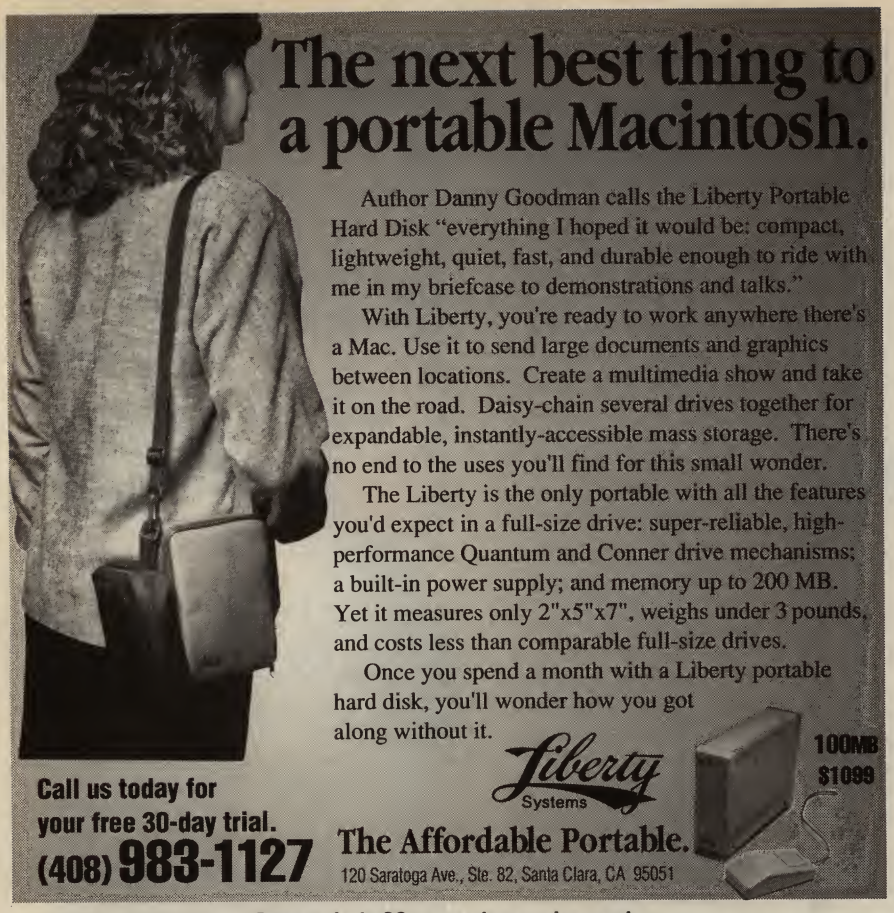
Finally, the payroll module is a full-function payroll system that can handle any number of employees. It can accommodate after-the-fact payrolls and can

Get Info

atOnce! ★★★★½
List Price: $495.
Published by: Layered, The Schrafft Center, 529 Main St., Boston, MA; (617) 242-7700.
Version: 1.0.
Requires: System 4.1 or later; two 800K drives (hard-disk drive recommended).
Application Size: 800K.
Compatibility: Mac Plus or later.



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Copy II for the Macintosh is a collection of three utility programs and a new desk accessory, Locate. Copy II combines powerful utilities which enable you to: maintain and repair your floppy and hard disks, create archival backups and allow you to install applications directly onto your hard disk.

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Macworld 5/89

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START UP

automatically calculate all standard deductions as well as up to 20 standardized deductions.

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HOW IT WORKS atOnce! makes excellent use of the Mac interface and builds on the state-of-the-art programming techniques developed for the Insight series. The system's natural ebb and flow is easy to follow, and if you get tripped up, its excellent context-sensitive, on-line help quickly gets you back on track.

The documentation, which comes in two softcover volumes, is equally well organized and remarkably unimposing, considering that it's almost as thick as a desk dictionary.

atOnce! has clearly set the pace for small-business accounting, or write-up, systems. It has better password security than either Business Sense or Simply Accounting and, unlike its competitors, also packs customizable reports. During tests, the system performed well without exception. By virtue of its highly interactive and well-thought-out processing and interface design, atOnce! promises to become one of the first Mac accounting systems that acts as a business tool, not just a bean counter.

— Ken Landis

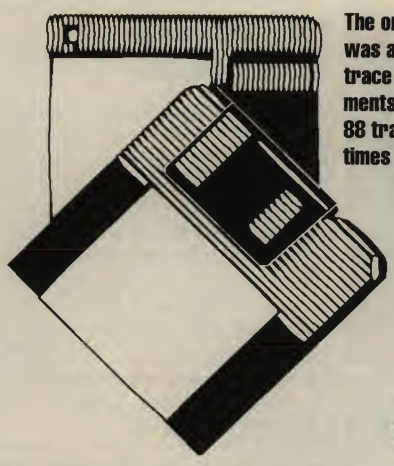
GRAPHICS

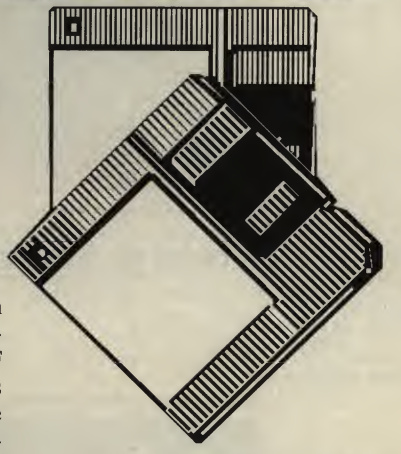
Streamline

PostScript auto-tracing is all you get for $395. But for those who need it, it's worth it.

Illustrator 88 already auto-traces, so why would Adobe now market a stand-alone auto-tracing application? Streamline is a utility that does nothing but auto-trace bit-mapped and PICT images. But it does it pretty well.

WHAT IT IS Anyone who has ever printed MacPaint (72 dpi) graphics on a





The original from which these tracings were made was a 72-dpi MacPaint line document. The Streamline trace (below) required only a few setting adjustments. The finished area of the incomplete Illustrator 88 trace (left) was done by hand and took several times longer than the entire Streamline trace.

LaserWriter knows that they suffer from the jaggies (stair-stepped edges, especially on curved or diagonal lines). TIFF (300 dpi) graphics don't. If your printer's resolution is much higher than that of the graphic it's printing, the product will usually look jagged.

The best answer to this problem has been PostScript. Because PostScript describes shapes geometrically (independently of the number of dots per inch), any PostScript-compatible printer can print graphics at its maximum resolution, minimizing jaggies. Auto-tracing converts bit-mapped and PICT images to PostScript, which is perfect for converting scanner output and bit-mapped clip art.

There's much to like about Streamline. The manual is only 24 pages long. Streamline's only commands are on the File menu, and it does its job with little human help. The menu choices improve results in specific circumstances. Adobe points out that the higher the resolution of the original graphic, the more accurate the results. High-resolution TIFF or PICT files yield better results than 72-dpi MacPaint graphics, and black-and-white line art auto-traces better than halftones.

Streamline provides three methods of tracing: Outline (the default), Centerline, and Centerline & Outline. It traces the outline of each shape that makes up a finished image and fills it with either black or white. A letter O ends up as a black-filled oval with a smaller, white-filled oval layered on top. The Outline method is best for freehand art with changing line widths and shapes. Outline tracings contain only filled shapes, no single lines. The Centerline method locates the center of each line that makes up the picture and draws a single trace line along it. The letter O becomes a single oval. This method is better for detailed drawings with even line widths and no filled areas, such as parts diagrams and CAD or architectural drawings. In the Centerline & Outline method, Streamline uses Outline on areas it decides are large, filled shapes and Centerline on areas thinner than a specified line width.

Streamline gives you some latitude in selecting how closely it will follow the edges of a bit map. More tolerance smooths the finished product; too much tolerance loses detail. You can also tell Streamline to ignore shapes smaller than a certain number of pixels, which is useful for scanner output, which often contains a few extraneous dots from dirt on originals or the scanner glass. The default settings seem to work fairly well, but they can be fine-tuned to produce print-

Get Info

Streamline ★★★½
List Price: $395.
Published by: Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900; (415) 961-4400.
Version: 1.0.
Requires: System 4.2 or later; 2 megabytes recommended.
Application Size: 75K.
Compatibility: Mac Plus or later.



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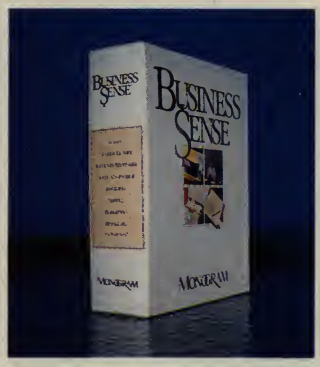


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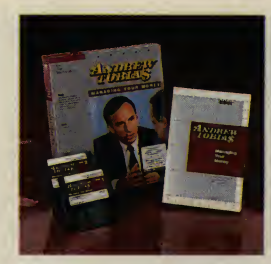
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DiskLock ..... 108.
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On Cue ..... ***Special*** 35.
Ideaform
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MacPrint ..... ***Special*** 79.
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Peripheral Land TurboOptimizer ..... 39.
TurboBack ..... 55.
TurboCache ..... 73.
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SuperSpool 5.0 ..... ***Special*** 59.
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ready (or nearly so) images, since Streamline automatically retains the original's blacks and whites.

Streamline has no graphics-editing tools. It isn't intended to produce finished art. Adobe recommends that Streamline files be reworked in Illustrator for two reasons. First, Streamline can create files that won't print because the trace lines are too long. Illustrator automatically breaks those lines into a manageable size. And second, Illustrator has the tools necessary to work on images.

HOW IT WORKS I like Streamline. It doesn't require much learning time, does its job well, and can even process a full folder of graphics without interruption. It handles FreeHand drawings nicely. Technical drawings, however, require too much tinkering with the program's settings and still produce less-than-ideal results. Nevertheless, Streamline auto-traces faster and better than Illustrator or FreeHand. Canvas is a capable auto-tracer, but it can't save documents as PostScript files.

For a separate utility, $395 is steep. If you need to auto-trace a lot of art, you should have Streamline. If not, Illustrator, FreeHand, or Canvas will suffice, and they'll give you the tools for touch-ups in the bargain.

— Darryl Lewis

HARDWARE

StarTime/VideoShow

An unusual software/hardware combo adds portability to presentations, but its limitations are hard to justify at this price.

Desktop presentations may not be at the height of hype anymore, but that hasn't stopped manufacturers from producing more presentation tools. General Parametrics' StarTime is custom software for converting presentation materials to a format that can be used by the company's VideoShow presentation hardware. The VideoShows are expensive boxes that display presentations converted to run under General Parametrics' VideoShow Operating System (VOS), allowing you to give a Mac-created presentation without having a Mac anywhere in the area — and letting you create a color slide show from a Mac Plus or SE.



General Parametrics' VideoShow Executive is an expensive peripheral that lets you create color presentations on an SE and present them without a Mac.

PHOTOGRAPHY: PETER ALAN GOULD

WHAT IT IS StarTime accepts PICT or PICT2 files from all the major presentation and draw packages. Once the files have been imported into StarTime, you can sort them, change or add background colors, resize or crop images, combine images to form composite images, and add transitions. The software isn't anywhere near as powerful or as versatile as the programs used to create the original, but it's not at all difficult to produce decent presentations with it. Some of the commands are a bit strange, but once you master the software, it's OK.

You can preview your presentation on your Mac; when you're satisfied with it, you create a VideoShow disk containing the presentation and the VOS files. The ordinary 3.5-inch disk is a VideoShow disk, not a Mac disk, so it must be handled with great care. If you ever put it back into a Mac, the Mac will want to reformat it; that is, your presentation vanishes. Mark the VideoShow disks clearly and keep them separate from your Mac and its disks. If you want to convert your StarTime screens into slides, you need another General Parametrics box — the PhotoMetric SlideMaker (see "Graphics on the Slide" in this issue).

StarTime has only two substantial problems. First, it doesn't support the huge range of transitions and special effects of which the major presentation packages are capable, so you must stick to simpler effects. Second, VideoShow has a limited selection of built-in outline fonts, as do LaserWriters. For optimal font spacing, you need to have the correct screen fonts installed in your Mac; otherwise, type won't appear exactly where you want it. Unfortunately, StarTime comes with a note saying that its screen fonts are not included in this release and that you should substitute Apple fonts. The Apple fonts make poor substitutes for the real thing, however, and using them will cost you lots of time in trial-and-error positioning. The correct screen fonts should be out by the time you read this, and if they produce true WYSIWYG results, they will greatly improve StarTime's usefulness.

HOW IT WORKS I can't get enthusiastic about this software. It works and does what it claims to do, but it feels clunky, especially when it is compared with More II, StandOut!, or Persuasion. StarTime was created to take advantage of

Get Info

StarTime/VideoShow

List Price: StarTime, $199; VideoShow Model 240 (Companion), $1,795; Model 260 (Executive), $3,995; Model 280 (Professional), $9,495.
Manufactured by: General Parametrics, 1250 Ninth St., Berkeley, CA 94710; (415) 524-3950.
Version: 1.0.
Requires: System 6.0 or later; 20-megabyte hard disk, color monitor, and presentation software.
Application Size: 260K.
Compatibility: Mac Plus or later.

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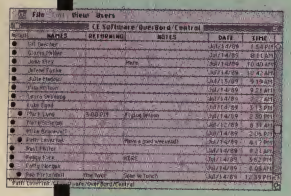
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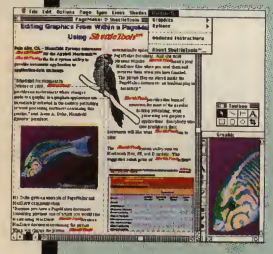
Products on the Horizon

In/Out, the latest network product from CE Software, is designed to look like and act as a conventional office in/out board. In/Out runs in the background on any networked Mac and automatically keeps track of who's in and who's out by recording their log-on status. Using In/Out, workers can post and check their daily calendars, schedule facilities, create special screens for separate departments and groups, and receive an automatic notification when a coworker returns to the office.



In/Out, $199.95 (five users); $299.95 (ten users). CE Software, 1854 Fuller Road, P.O. Box 65580, West Des Moines, IA 50265; (515) 224-1995.
ETA: August 1989.

ShuttleTools, a utility from Mansfield Systems, provides some of the interapplication communications functionality that Apple promises in System 7.0. Using ShuttleTools, you don't need separate graphics files when you're editing a layout. ShuttleTools lets you consolidate everything into one page-layout file, and if you want to edit or change a graphic, all you have to do is select it and use a menu command. ShuttleTools opens the image in its originating application, and any alterations automatically appear in the layout; you don't need the original graphics file, and you can edit the layout without reflowing.



ShuttleTools, $95. Mansfield Systems, 550 Hamilton Ave., Suite 150, Palo Alto, CA 94301; (415) 326-0603.
ETA: October 1989.

Mac graphics, but not necessarily as a Mac program.

The various VideoShow models work with RGB (standard Mac color) monitors and National Television Standards Committee (NTSC, domestic) and phase-alteration-line (PAL, international) analog monitors. Check before buying a particular model to see if the unit you are considering will work with the monitor or monitors you plan to hook up. The top-of-the-line models have remote controls; the basic model has a top-mounted control panel. All of them can output to a variety of devices, including videotape and paint-jet printers.

The units can be connected to the Mac through a SCSI connection or through either serial port. You need the StarTime manual to hook up a VideoShow box correctly. Video connection requires the correct cables, which are available from General Parametrics.

The VideoShow is designed for presenters who take their show on the road. It's more transportable and lighter than the smallest possible Mac color-presentation combo (which requires a Macintosh IIcx, keyboard, mouse, 13-inch color monitor, and cables). The VideoShows fit into elegant travel cases that make an excellent impression when you walk in and set up. If presentations that are slightly better than IBM PC–quality presentations are good enough, they'll do the job.

Considering their abilities, the VideoShow units are very expensive. The top model offers twice the RAM of the most basic model and a remote control, but it more than doubles the tariff. Prices ranging from around $2,000 to more than $9,000 are rather hefty for the convenience of StarTime/VideoShow.

— Steven Bobker

GRAPHICS

Drawing Table

A few major interface flaws make this low-priced draw program a poor choice.

Drawing Table is an inexpensive eight-color draw program that would be an ideal alternative to MacDraw II for those who need a simpler graphics tool — were it not for maddening flaws in its interface.

WHAT IT IS Drawing Table sports all the basic drawing tools you expect in a MacDraw II competitor. The largest document it can handle is 42 x 42 inches, and the thinnest line it can draw is 1/720 inch — about half as thick as what a LaserWriter can render. You can easily make it zoom from 1/16 to 8 times normal view by using a key combination or menu command, and a panning option gives you a quick way to view neighboring areas by positioning a floating frame. At every level, Drawing Table magnifies, reduces, and renders images quickly and smoothly.

As with MacDraw II, only eight colors (red, green, blue, cyan, magenta, yellow, black, and white) are available, but any two of them can be combined in fill patterns. By varying the foreground and background colors, it's possible to produce a wide range of colors. However, Drawing Table's fill patterns can't be edited dot by dot as they can be in MacDraw II or Canvas 2.0.

Drawing Table's other noteworthy features include freely rotatable text and the ability to bind text along any path or shape. It offers bound text in four forms: left-justified; centered; right-justified; and fully justified, where the text runs from one end of a path to the other or completely around a circle or rectangle, whatever its size. You can scale anything you draw or import in Drawing Table by any factor you choose. And you can scale line thickness, text, and object dimensions in any combination. Reshaping objects relies on three basic tools: One repositions points along a path, another inserts new points, and the third deletes points. You can reshape, add, or subtract points from polygons, freehand paths, ellipses, and arcs.

Drawing Table can import MacPaint, PICT, and EPSF art. To help the shy or hurried artist off to a quick start, it comes with separate libraries of object-oriented clip art, including arrows, landscaping, and chart symbols. Its duplication tool lets you copy art from one window to

FOR THOSE OBSESSED WITH PERFORMANCE, A HARD DISK THAT MATCHES YOUR OBSESSION.

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another simply by dragging a copy without cutting, pasting, or deactivating your working window. If you do a lot of clipping or regularly work with more than one illustration, then you can open several documents, position their windows where you choose, and save the arrangement as a project. When you want to resume work, you can open the project (instead of opening each individual document), and all the project's documents will open, zoomed and positioned as they were originally.



Drawing Table is a low-priced but seriously flawed alternative to MacDraw II. Its frustrating selection interface made simple editing and rearranging a major chore.

HOW IT WORKS Drawing Table's crucial failing is its object-selection method. The program treats every object as if it were bonded to a rectangular sheet of glass. If you click anywhere within one of these sheets—called bounding rectangles—whether or not you click on an outline, you'll select its contained object. Unfortunately, the glass acts as an impenetrable solid, so there are no empty objects in Drawing Table. Even though you can see one object through another, you can't just click-select it. You must first use the Select Under command once for each object in your way, and you must do it every time you need to reach the elusive item.

This process is frustrating when you're revising a drawing. Even if the outlines of two nearby objects don't overlap, their bounding rectangles may, which makes it difficult to select one object without the bounding rectangle of some other object stealing the click. There's a feature called Preselection Highlight, which encloses an object with a rectangular frame as the cursor passes over it to indicate that it would be selected if the mouse were clicked. It's handy for identifying objects in a crowd, and it partly reduces the

Get Info

Drawing Table ★★½

List Price: $129.
Published by: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101; (415) 479-1700.
Version: 1.0.
Requires: System 4.1 or later; two 800K drives.
Application Size: 330K.
Compatibility: Mac Plus or later.

Rumor Manager

Gossip, Guesses, and Goings-On

Look for something new in CAD/CAM software. It'll be called Active CAD. The word active is significant. It will be intelligent software, smarter than the already-intelligent LANDesign (by Compuneering), which can finish what you start if you get close enough. Active CAD will be able to finish far more complex shapes automatically. It will be able to create and mesh — to any specified tolerance — complex gear sets based on limited sets of user-supplied parameters. Users will be able to move the brackets or center points about, and the program will not only redraw everything correctly and automatically but it will also, if the Full Active feature is toggled on, redesign the whole set to keep the specified output parameters.

Active CAD can do the same thing for most other shapes and mechanical devices. It should prove to be a major productivity enhancer for CAD/CAM users. It's being written from the ground up for System 7.0, and current plans require at least 8 megabytes of RAM and 160 megabytes of mass storage, because Active CAD builds many huge temporary files so it can work quickly. Its price will depend to some degree on when System 7.0 actually gets going.

The next generation of 256–gray-level scanners is about to come out. Most will stick to 300- or 400-dpi resolution, but they will work much faster than current units. Speed increases by an order of magnitude or two (10 to 100 times) will be available. One innovative and expensive top-end unit is meant for scanning bound material and has a Rube Goldberg–like automatic page turner that you won't believe until you see it in action. Built-in, quality optical–character-recognition (OCR) software is also expected to be standard.

A new type of software is sweeping Europe. Called "reading-processor software," it turns people into more efficient readers by running a line of text across the screen at a constant, user-definable rate. It can also be used as an educational tool.

Currently, material must be preprocessed. That's a problem that some of the new scanners mentioned above will solve. Until then, users must rely on the preprocessed material or use a slow, expensive reading-processor utility.

Here's some material from a current European ad: "Reading-processor software works by generating a dynamic Word Face from stored text, which effectively takes the work out of reading."

Heard any good rumors lately? If we use your rumor, we'll send you a token of our appreciation and promise not to use your name. Anonymous contributions are also accepted.

Our U.S. Mail address is Rumor Manager, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Our electronic addresses are MacUser (on MCI Mail), 74206,204 (on CompuServe), and MacUser.Edit (on AppleLink). No calls, please.

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confusion caused by Drawing Table's eccentric selection rules.

But there are other problems. Although one of its four fill-pattern palettes seems to contain a generous gray-shade selection, it doesn't. Only eight of all the available fills print as true grays. The rest are ordinary fill patterns. I discovered this undocumented behavior only after comparing a laser-printed illustration with its screen version. Drawing Table's rotation tool tends to alter the dimensions of the rotated object slightly even after it's returned to its original orientation. And choosing a fill pattern or line thickness for a selected object sets those attributes for all objects you draw thereafter.

Considering the low price, special features, and clip art in this package, I might forgive Drawing Table for its idiosyncrasies, but its selection interface is such a disaster that it can make producing even a simple illustration a chore. Drawing Table should be sent back to the drawing table.

— Rebecca Parascandolo

HARDWARE

Three Budget Hard Drives

For price-conscious buyers, here's a look at a trio of primarily direct-marketed hard-disk drives from Ehman Engineering, Microtech, and Mirror Technologies.

Let's start with the bottom line: If you've been waiting for the right time to allow the joys of disk swapping to fade into your glorious past, that time is now. Hard-disk drives are affordable and a practical necessity. Also, they make you happy.

THE RUNDOWN The drives reviewed here are fast, low-cost, and built by companies that are likely to be around in a few years if the drives ever need servicing. The drives all have these three critical features:

1. They're preformatted (including necessary Apple files) and auto-booting: Open box, take drive out, attach to Mac, turn on drive, let it warm up for half a minute, turn on Mac. That's it.

2. Automatic head parking: Whenever the power goes off, the head moves to a blank sector.

3. Dual SCSI ports for daisy-chaining.

What differentiates the drives are four factors: price, speed, the free software bundled with each, and the length of the warranty (see Table 1).

Ehman Engineering and **Cutting Edge** are two divisions of the same

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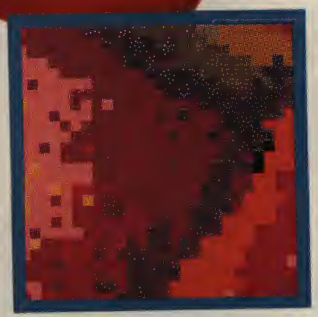


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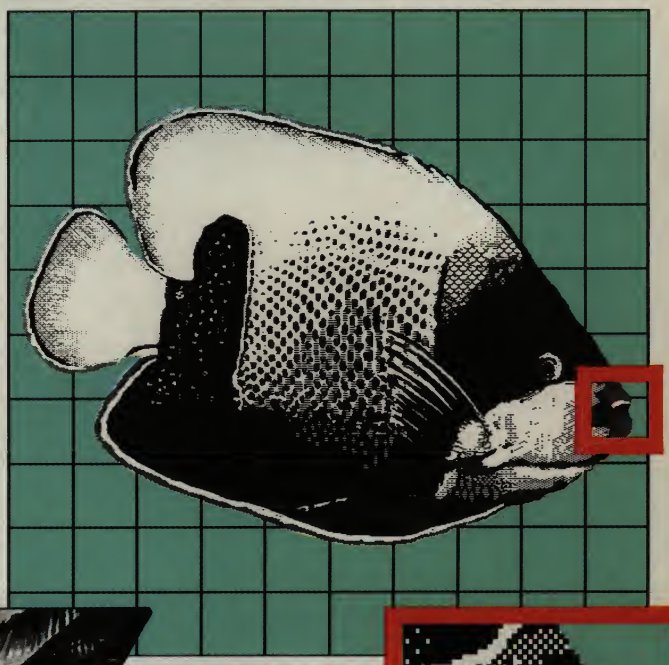
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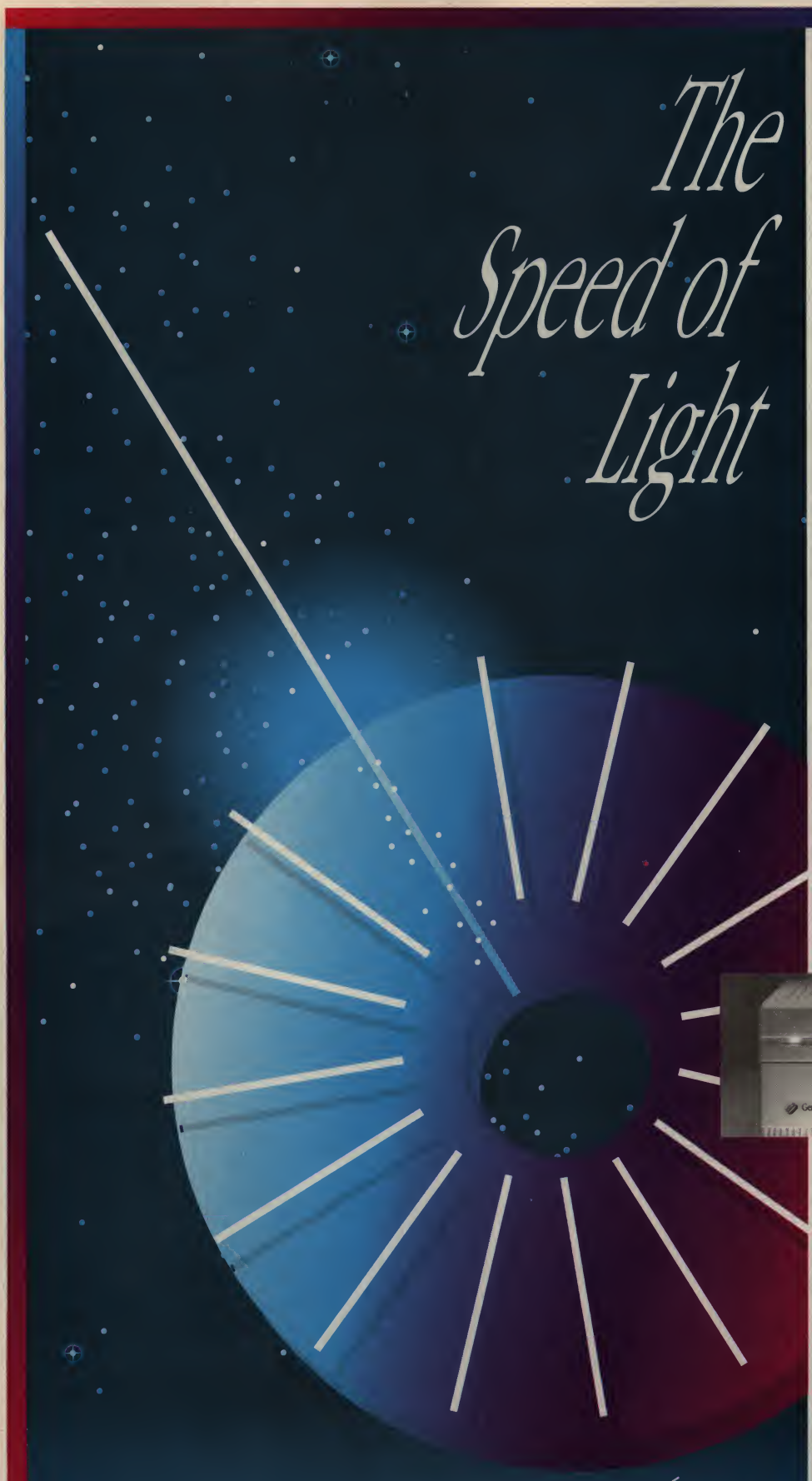
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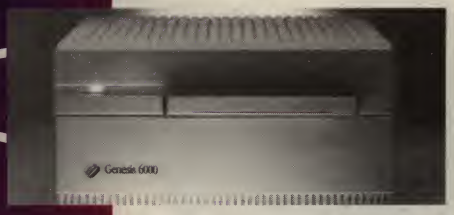
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Ad produced in Quark XPress and Illustrator 88 on a Macintosh II using a Genesis 6000

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company marketing the same drive in slightly different packages. Ehman Engineering is the manufacturer of both drives, and mechanically the two are identical. The front panels look different, but that's just cosmetic. Ehman Engineering sells directly to users, so its prices (for example, $479 for a 32-megabyte drive) are lower than those of Cutting Edge. Cutting Edge sells only to dealers. The suggested retail prices of its units are $749 for 32 megabytes and $829 for 47 megabytes. The ironic thing is that you may be able to find a volume dealer that can buy and sell the Cutting Edge units for even less than the Ehman drives.

Both drives have a flat design (the Cutting Edge drive is no longer wedge-shaped) and fit under a standard Mac as if the two were made for each other. The actual hard-disk assemblies (HDAs) are manufactured by Seagate.

The usual Apple System files are included on the disk, along with some public-domain programs. Ehman also bundles Central Point Software's PC Tools Deluxe utilities package (reviewed in the August '89 issue), which includes utilities for hard-disk backup, data recovery, and disk management. Cutting Edge doesn't include this package with its units.

The power supply on all Ehman/Cutting Edge drives is auto-switching to allow international use. The terminator is internal, but you can open a door and remove terminator packs if you're daisy-chaining a series of devices and the drive is between two terminated units. The SCSI ID is easy to set with an external rotary switch.

The **Microtech** unit reviewed was the Nova External Hard Drive 40, a 40-megabyte drive with a retail price of $649.

Established in 1985, Microtech was the innovator of the 800K external floppy drive for the Macintosh. Its lines of drives now include not only the 800K but also the Nova internal and external hard-disk-drive series; removable hard-disk units; and tape-backup systems, available in 60- and 150-megabyte capacities. The company provides a five-year warranty, the longest offered by any of

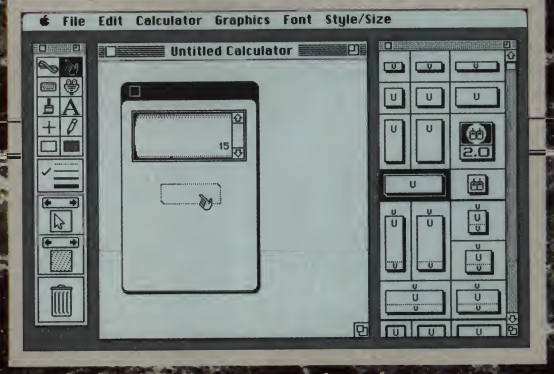


These hard drives from Ehman Engineering, Microtech International, and Mirror Technologies (left to right) are good economical choices for anyone needing storage on a budget.

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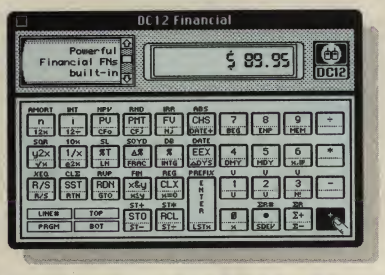


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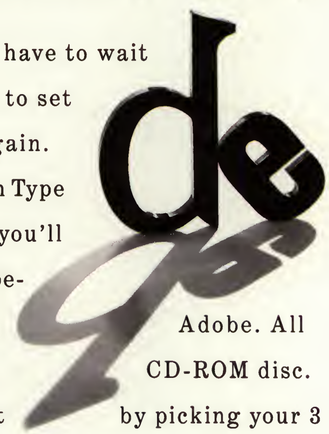
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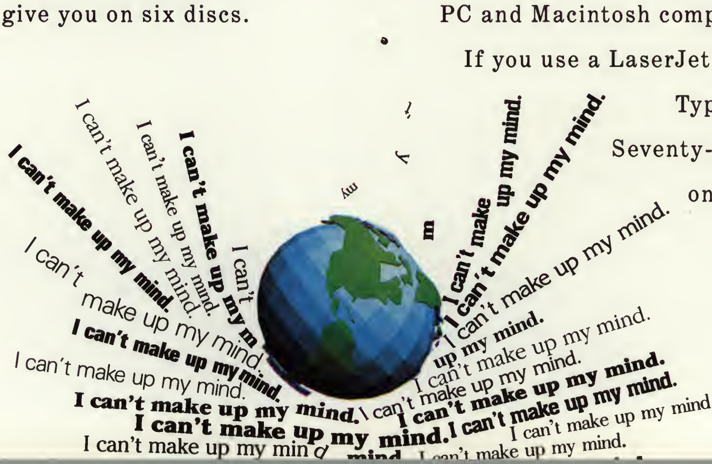
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the manufacturers whose drives are reviewed here.

Microtech also includes Apple's most recent versions of the System and MultiFinder. The drive features a voltage selector and a push-button switch for SCSI address changing.

The drive inside the Nova 40 unit is made by Quantum. Its standard access time is rated at 19 milliseconds, but its DisCache feature (64K of memory) allows access times to drop to as few as 12 milliseconds. The Quantum drive has an AIRLOCK locking system that moves the heads to a dedicated "landing zone" on power-down — a step beyond a generic auto-park feature.

Bundled with each Nova drive is MacTREE Plus, which displays folders and files in a visual "tree" structure. Another utility, DS BACKUP, lets you back up to floppies, other hard drives, or removable drives (for more on this, see the July '89 issue). The free software bundle also includes a variety of public-domain programs.

Mirror Technologies is another company that has been around a relatively long time — since 1985. If its stability doesn't fill you with enough confidence, it'll let you try one of its drives for 30 days, with no strings. If you don't want the drive, send it back. If it ever breaks down, the company claims to have a better-than-48-hour turnaround on repairs.

An interesting and useful bundle of software comes with Mirror's line of drives. It includes public-domain and Apple system software. There is also a Mirror utility for reformatting the hard disk. The icing on the cake, however, is a CE Software library with modified versions of QuicKeys, DiskTop, CalendarMaker, MockPackage Plus, and MacBILLBOARD.

THE VERDICT The three hard-disk drives reviewed here offer a variety of choices. First, there's speed. If that's what you're looking for, check out the numbers in Table 2.

For sheer dollar value, the Ehman drive is hard to beat, giving you 32 Seagate megabytes for $479 ($14.97 per megabyte). Mirror charges $587 for its Seagate 32-megabyte unit ($18.34 per megabyte), but it stretches the warranty to two years. Microtech seems to be aiming at buyers interested in top-quality merchandise. The Microtech unit, a 40-megabyte Quantum, compares favorably in price at $649 ($16.23 per megabyte) with the two 40-megabyte drives offered by Mirror, a unit with a slower Conner HDA ($687, or $17.18 per megabyte) or one with a Quantum HDA ($737, or $18.43 per megabyte). Microtech also gives a five-year warranty rather than Mirror's two-year one.

Hard drives can make more noise than your Mac, depending on which Mac you own. I asked a randomly chosen focus group (my wife and oldest daughter) to listen to each drive in a quiet room, and each independently rated Mirror's as the quietest and Ehman's as the loudest, with Microtech's in the middle.

Of the three units reviewed, if it were my birthday present, I'd ask for the Microtech drive. It's bigger and faster than the other two are, and it has that unusual five-year warranty. But if I could choose from all three manufacturers' complete lines of hard drives, if price were no object, and assuming the noise level were comparable to that of the models I tested, I'd prefer the Mirror unit with the Quantum 40 because it's big, fast, and quiet. Take your pick and enjoy.

— **Charles Spezzano**

Table 1: Hard-Disk Specifications

	Cutting Edge	Ehman	Mirror	Microtech
HDA	Seagate	Seagate	Seagate	Quantum
Capacity (MB)	32	32	32	40
Claimed access time (ms)	23	23	40	19
Price	$749	$479	$587	$649
Warranty	1 year	1 year	2 years	5 years

Table 2: Hard-Disk Performance*†

Test	Ehman/ Cutting Edge 32 MB	Microtech Nova 40	Mirror Technologies M30
Disk Timer II (access time in ms)	37	28	38
Disk Basher 1.03§ (in sec)	72.52	43.95	98.37
File duplication¶ (in min:sec)	1:02	0:39	1:08

*All times are averages.
†All tests performed on a standard, 1-megabyte SE.
§Disk Basher simulates average use by reading and writing randomly sized blocks of data into a 10-megabyte file.
¶Time to duplicate a 2,923K file.

Get Info

Ehman/Cutting Edge 32-Megabyte Hard Drive

$$$$

List Price: Ehman, $479; Cutting Edge, $749.
Manufactured by: Ehman Engineering, P.O. Box 2126, Evanston, WY 82931-2126; (800) 257-1666 or (307) 789-3830. Cutting Edge, P.O. Box 1259, Evanston, WY 82931; (800) 443-5199 or (307) 789-0582.
Compatibility: Mac Plus or later.

Microtech Nova 40

$$$$½

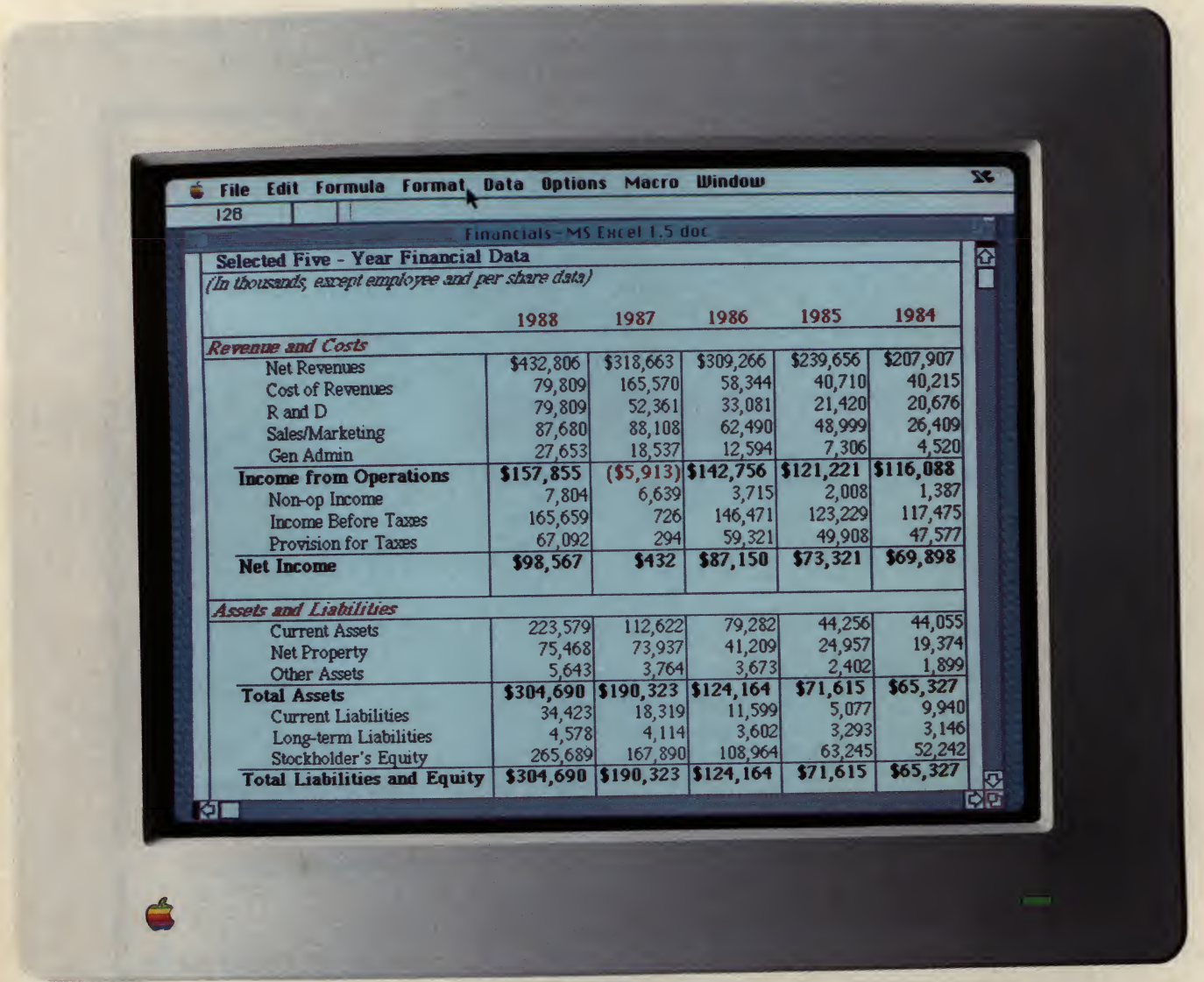
List Price: $649.
Manufactured by: Microtech International, 29 Business Park Drive, Branford, CT 06405; (800) 325-1895 or (203) 488-7744 (in CT).
Compatibility: Mac Plus or later.

Mirror Technologies M30

$$$$

List Price: $587.
Manufactured by: Mirror Technologies, 2644 Patton Road, Roseville, MN 55113; (612) 633-4450.
Compatibility: Mac Plus or later.

90% of Macintosh spreadsheet users have been working on this program.



Selected Five - Year Financial Data

(In thousands, except employee and per share data)

	1988	1987	1986	1985	1984
Revenue and Costs					
Net Revenues	$432,806	$318,663	$309,266	$239,656	$207,907
Cost of Revenues	79,809	165,570	58,344	40,710	40,215
R and D	79,809	52,361	33,081	21,420	20,676
Sales/Marketing	87,680	88,108	62,490	48,999	26,409
Gen Admin	27,653	18,537	12,594	7,306	4,520
Income from Operations	**$157,855**	**($5,913)**	**$142,756**	**$121,221**	**$116,088**
Non-op Income	7,804	6,639	3,715	2,008	1,387
Income Before Taxes	165,659	726	146,471	123,229	117,475
Provision for Taxes	67,092	294	59,321	49,908	47,577
Net Income	**$98,567**	**$432**	**$87,150**	**$73,321**	**$69,898**
Assets and Liabilities					
Current Assets	223,579	112,622	79,282	44,256	44,055
Net Property	75,468	73,937	41,209	24,957	19,374
Other Assets	5,643	3,764	3,673	2,402	1,899
Total Assets	**$304,690**	**$190,323**	**$124,164**	**$71,615**	**$65,327**
Current Liabilities	34,423	18,319	11,599	5,077	9,940
Long-term Liabilities	4,578	4,114	3,602	3,293	3,146
Stockholder's Equity	265,689	167,890	108,964	63,245	52,242
Total Liabilities and Equity	**$304,690**	**$190,323**	**$124,164**	**$71,615**	**$65,327**

To learn more, call for the Microsoft Excel 2.2 brochure, (800) 541-1261, Dept. K16. Customers in Canada, call (416) 673-9811. Outside North America, call (206) 882-8661. ©Copyright 1989 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and *Making it all make sense* is a trademark of Microsoft Corporation. Macintosh and Mac are registered trademarks of Apple Computer, Inc.

So have we. Introducing Microsoft Excel 2.2.

In 1985, not long after the Macintosh® was unveiled, Microsoft® Excel became the most compelling reason to buy one.

Within minutes, it became a standard on the Macintosh. Before we knew it, a full 9 out of 10 Macintosh spreadsheet users were swearing by it. Not surprisingly, they still are.



Used to be, 1MB was enough. Now with Microsoft Excel 2.2, you can take full advantage of the 8 megs in today's most powerful Macintoshes.

But, of course, we weren't satisfied to leave well enough alone—and Microsoft Excel version 2.2 has come to the small screen. In a big way.

In mathematical terms, 2.2 is greater than 1.5. In technical terms, your spreadsheets aren't limited to 1MB of memory—version 2.2 makes the most of even 8meg machines.

Which translates into spreadsheets of outrageous proportions.

Equally outrageous: 40% faster calculations—thanks to advanced intelligent recalc.

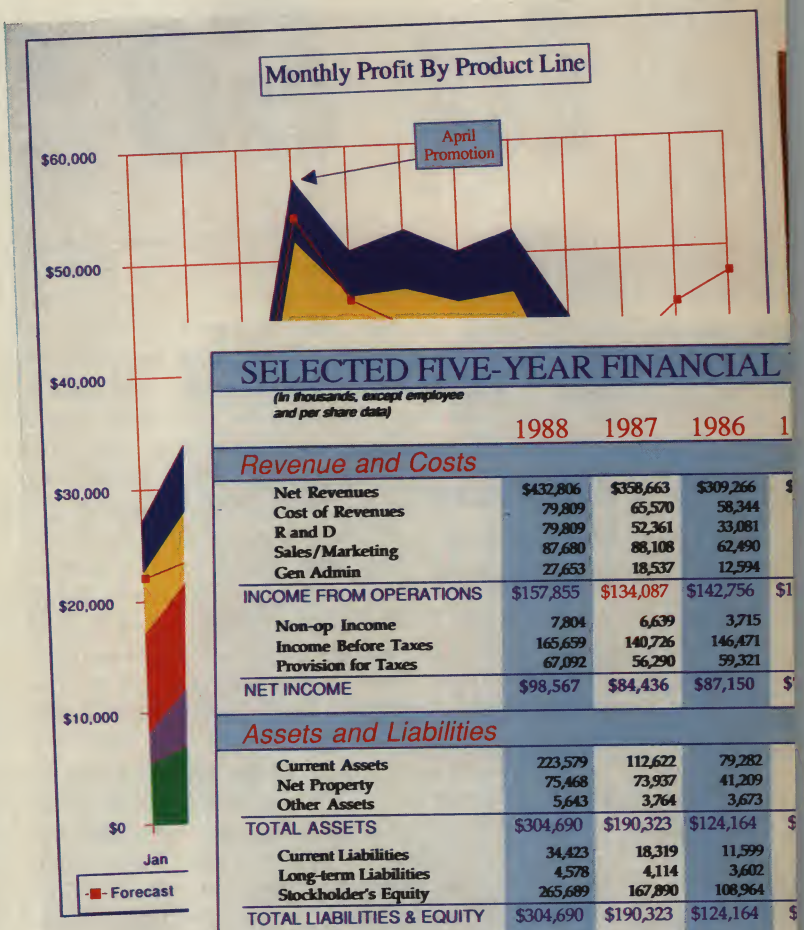
As for presentation? Version 2.2 also lets you highlight data in ways well worth highlighting: You can pick up to 256 different fonts per sheet, including up to six styles and eight colors. You can change row height. You can shade. And basically pack your documents with more visual punch than ever before.



Microsoft Excel version 2.2. Another improvement designed to make Mac® enthusiasts even more enthusiastic.

Something 90% of you are already used to. And you other 10% easily can be.

Microsoft®
Making it all make sense.



SELECTED FIVE-YEAR FINANCIAL

(In thousands, except employee and per share data)

	1988	1987	1986	1
Revenue and Costs				
Net Revenues	$432,806	$358,663	$309,266	$
Cost of Revenues	79,809	65,570	58,344	
R and D	79,809	52,361	33,081	
Sales/Marketing	87,680	88,108	62,490	
Gen Admin	27,653	18,537	12,594	
INCOME FROM OPERATIONS	$157,855	$134,087	$142,756	$1
Non-op Income	7,804	6,639	3,715	
Income Before Taxes	165,659	140,726	146,471	
Provision for Taxes	67,092	56,290	59,321	
NET INCOME	$98,567	$84,436	$87,150	$
Assets and Liabilities				
Current Assets	223,579	112,622	79,282	
Net Property	75,468	73,937	41,209	
Other Assets	5,643	3,764	3,673	
TOTAL ASSETS	$304,690	$190,323	$124,164	$
Current Liabilities	34,423	18,319	11,599	
Long-term Liabilities	4,578	4,114	3,602	
Stockholder's Equity	265,689	167,890	108,964	
TOTAL LIABILITIES & EQUITY	$304,690	$190,323	$124,164	$
Working Capital	189,642	173,468	127,766	
Number of Employees	3,456	2,727	1,681	
Common Stock Data				
Net Income per Share	$1.13	$1.64	$1.94	
Book Value per Share	$4.56	$3.56	$2.29	
Cash and Investments	$2.65	$1.60	$0.83	
Average Shares Out	87,535	83,258	44,956	
Shares Out/Year-end	86,790	51,305	26,589	
Key Ratios				
Return on Net Revenues	23%	23%	28%	
Return on Total Assets	32%	44%	70%	
Return on Stock Equity	37%	50%	80%	

Now pick from 256 fonts. Change row height. Shade. Add notes. And get used to the sound of applause.

Mac *to Go*



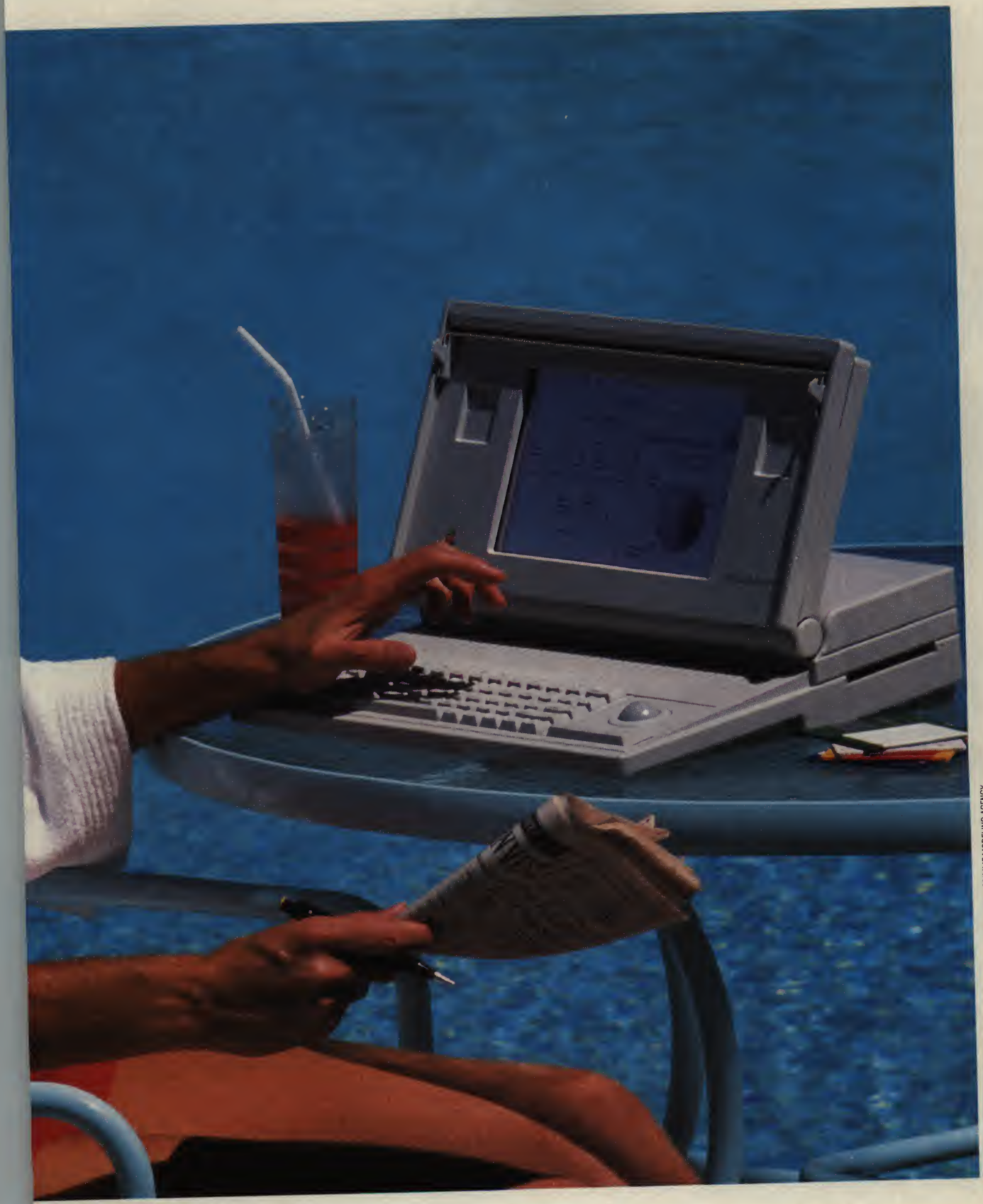
The miniature Macintosh is here, but is it what we've all been waiting for?

Speculation has been great, expectation high, rumor rife. The existence of prototypes has been known for more than a year. Early drafts of documentation, pried loose by freelance spies, were soon made public — much to the chagrin of Apple. Tantalizing Knowledge Navigator videos from Apple built the suspense even higher with a luscious depiction of a book-sized Mac of the future. Yes, when it came to a miniaturized Macintosh, you could hear the bating of collective breath, but because of the long wait, some folks turned Blue. John Sculley was adamant, though: There'd be no Mac portable before its time.

And now it's here. After all the waiting (with the possible exception of the 1984 original, no Macintosh has been awaited so impatiently), an impudent question arises: Is *this* the portable Mac we've been waiting for (speaking from a strictly technological standpoint)? Or should we still be holding our breath? It's true, the Portable is by far the most complex piece of machinery devised for sale by Apple. But it *is* rather bulky, somewhat heavy, and a tad on the expensive side. For many, though, it's a Macintosh in every respect — and that's the bottom line.

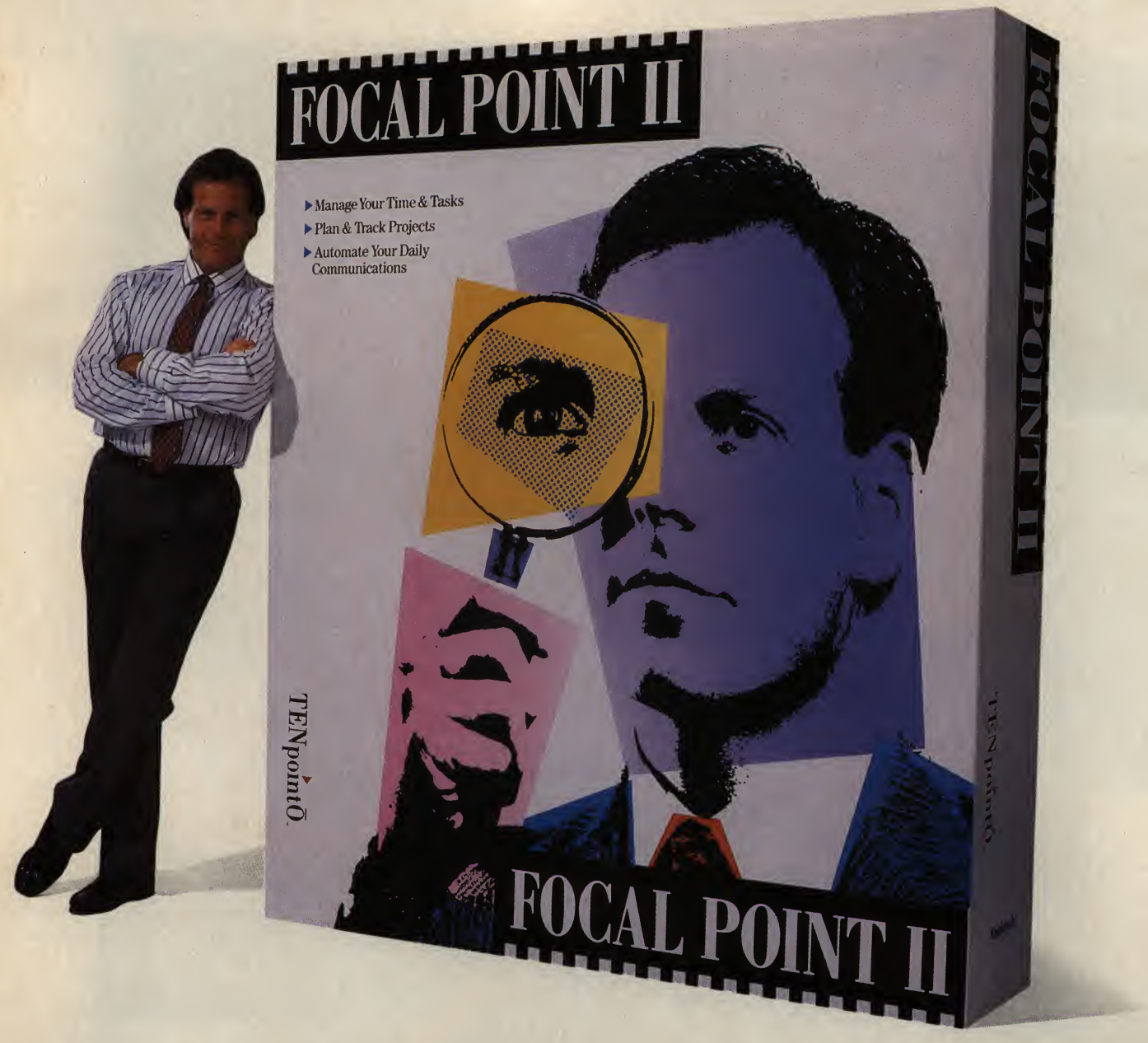
Whether or not Apple's Portable fills the bill, there are five major hurdles in the design of a next-generation portable: display, power, component miniaturization, data storage, and cost. Each presents a technological challenge that must be surmounted for the product to be successful. And the solution to each problem affects the other solutions in a complex way.

By John J. Anderson and John Rizzo



PHOTOGRAPHY: WALT DENSON STYLIST: NINA BARNEY MODEL: GREG CASSIN, GRIMME MODELING AGENCY

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Apple's Portable Macintosh tapers from approximately 4 inches in the back to 2 inches in the front. As shown above, the floppy drive is accessed on the right side of the machine.

Physical Witness

The Mac Portable is basically an enhanced SE with performance close to a Mac II's. The AC- or battery-powered unit is driven by modified SE ROMs and a CMOS 68000 running at 16 megahertz, twice the clock rate of a standard SE. It sports the I/O ports of an SE and comes standard with an FDHD drive, the 1.4-megabyte DOS- and ProDOS-compatible drive that is used in all the new Macs and that is now shipping in the SE as well. A 3.5-inch, 40-megabyte internal hard-disk drive and a second floppy-disk drive are optional. The unit has a slew of special features designed to accommodate its use in the United States and abroad. And the Macintosh Portable runs every software program that an SE runs — in other words, it's 100-percent Macintosh.

As a result, the machine is larger than most users might want. With dimensions of about 15 x 15 x 4 inches (tapering to 2 inches), the Portable will be tricky to use on an airliner tray unless you're in first class. (Considering its price tag of $6,500 to $7,000, that's where the Portable is most likely to be seen anyway.) In short, this is no notebook computer — or laptop either — unless you're endowed with the amplest of laps. (A laptop computer is typically one that fits easily inside a briefcase. The Portable itself is the size of a large briefcase, and its carrying case is nearly the size of a small suitcase.)

Furthermore, the Macintosh Portable is not a machine you'll want to haul around with you any more than necessary: It weighs slightly less than 14 pounds without an internal hard drive and a bit less than 16 pounds with one. Its beautifully designed over-the-shoulder carrying case, with pockets to hold odds and ends, brings the weight up to 17.5 pounds. Still, this is less than half the weight of a similarly outfitted SE in a standard carrying case.

The machine is handsome, and it looks and feels quite rugged. It is made of polycarbonate, the type of plastic used to make motorcycle helmets and bulletproof glass. Apple didn't provide us with any stress specifications, nor did it allow our Labs representative (you may have seen him in commercials for American Tourister luggage) to torture-test prototypes on location. One of us "accidentally" dropped a closed unit from a vertical to a horizontal position on a formica desktop to simulate the kind of nondisastrous jarring the unit will often suffer in the field. The only damage was to our hosts' peace of mind. Although the internal hard disk was not spinning at the time of the drop test, product manager Jim Cook assured us that the optional Conner hard-disk drive is as shockproof as money can buy. The incident supported his claim.

To open the Portable, push the integral carrying handle in, and the display hinges up, revealing the keyboard and a well-designed minitrackball. Stalwarts can still plug in an Apple Desktop Bus (ADB) mouse, provided they have access to a physical desktop. We suspect some diehards may be converted to the trackball, even when a choice is available. It can be positioned on the right or left side of the keyboard, which is great news for lefties. It can also be replaced with a custom numeric keypad, but then you'll need to use an external ADB pointing device. The keyboard is a full-sized 63-key model that is nearly identical to the Apple Standard (nonextended) Keyboard. So there is no learning curve, nor do the keys crowd each other as with other portable computers.



The Portable's keyboard is a standard 63-key nonextended model. The miniature trackball can be positioned to the left or right side of the keyboard.

Screen Test

Apple tackled the technical issues with state-of-the-art technology throughout, setting new standards for portables in the areas of

At a Glance: Mac versus DOS

	Mac Portable	Compaq SLT/286
Price includes 1 MB of RAM, (640K in PC) 40-MB hard-disk drive, 1.44-MB floppy-disk drive, operating system, and carrying case	$6,500 to $7,000	$6,208 with 640K $7,007 with 1.6 MB of RAM
Weight with battery and hard-disk drive	15.75 lb	14 lb
Battery life	8 to 10 hours	1.5 to 3 hours
Screen	Active-matrix LCD	Supertwist backlit LCD
Screen size	8.5 x 5.25 in.	8 x 6 in.
Screen size	640 x 400 pixels	640 x 480 pixels
Processor	16-MHz CMOS 68000	8- or 12-MHz 80C286
Number of keys on keyboard	63	82
Pointing device	trackball (optional mouse)	none (optional mouse)

Comparing the Mac Portable with the popular Compaq SLT/286, *PC Magazine*'s Editor's Choice for DOS portables, July '89.

The power to be your best.™

Macintosh® brought the power of a computer to everyone. Now the new Macintosh Portable lets you take it everywhere. Like all Macintosh computers, it runs thousands of powerful business programs that work in the same graphic, intuitive way. But because it's a portable, it'll run them on the run.



Portable doesn't mean light on power. In fact, the Macintosh Portable crunches spreadsheets and draws complex graphics twice as fast as the Macintosh SE, our most popular computer.

An optional adaptor lets you show your Macintosh Portable screen on a TV screen. So you can use your hotel room for a Desktop Media presentation. And with an optional internal modem, you can send or receive information anywhere in the world. As long as you're next to a phone.

With up to 2 megabytes of RAM, you'll have plenty of space to run the most sophisticated programs. And with up to 40 megabytes of internal hard disk storage, you'll be able to take a lot of them along. In very little space.

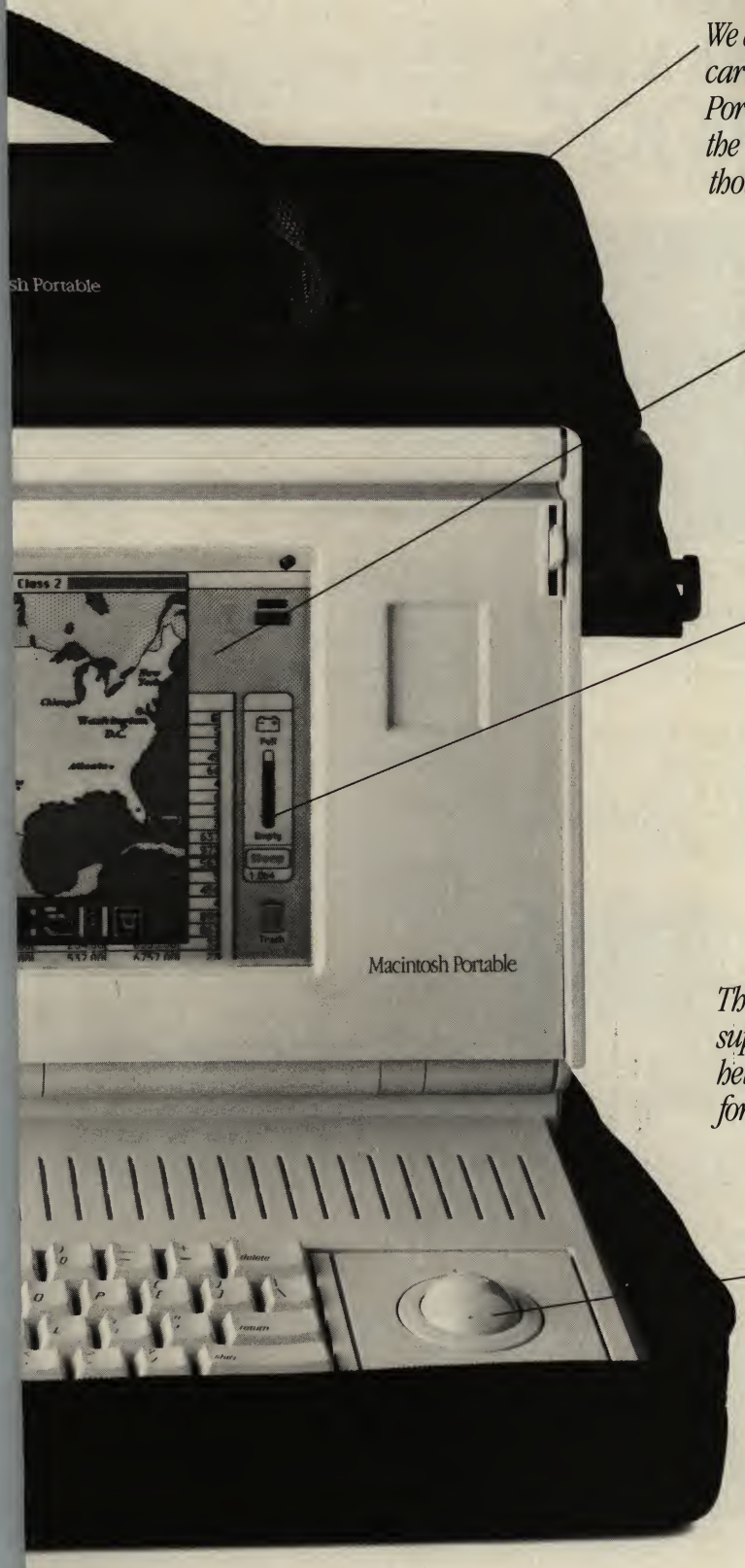
If the keyboard feels like a real Macintosh keyboard, there's a good reason. It is. Another reflection of our design philosophy: Portability, yes. Compromises, no.



The Macintosh

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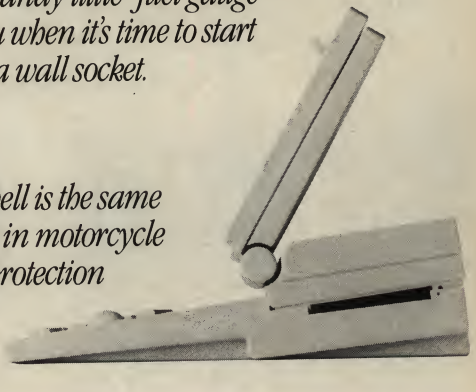
Even when there's no power.



We don't want you knocking around without a carrying case, so one comes with every Macintosh Portable. There's room for paperwork, extra disks, the battery charger, even an extra battery. We thought of everything.

Another thing you won't find in other portables is our Active Matrix display technology. The Macintosh Portable screen is the only battery-powered screen fast enough and sharp enough to display spectacular Macintosh graphics — even animation.

You could change the world in 10 hours. That's how long a battery charge typically lasts in the Macintosh Portable. That's 2-3 times longer than most other portables. A special Power Management System conserves power by putting the computer into a "sleep" mode whenever you take a break. It even has a handy little "fuel gauge" that tells you when it's time to start looking for a wall socket.



This polycarbonate shell is the same super-tough stuff used in motorcycle helmets. Appropriate protection for a precious brain.

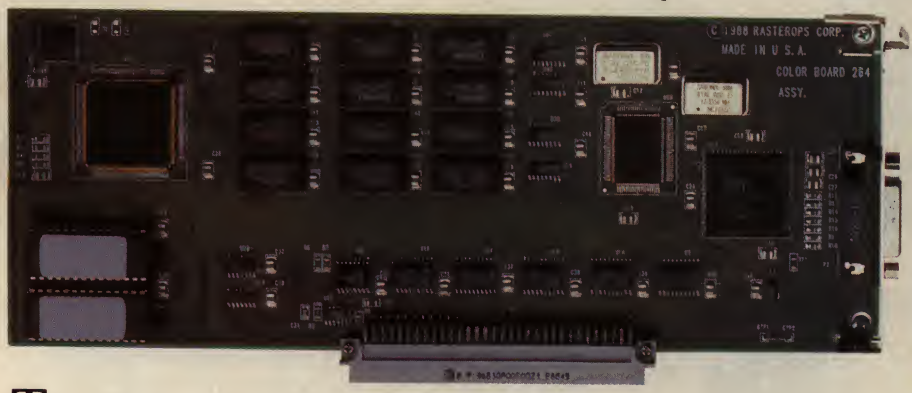
The trackball does everything a mouse does. In less space. It allows you to control the computer without complex keyboard commands. You can even switch it to the other side of the keyboard if you're left-handed. Or if you still prefer the mouse, just plug it into the back. No other portable can give you the thoughtful details you'll find in the Macintosh Portable. Simply because no other portable is a Macintosh.

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RasterOps 24-bit color for MacII & SE/30

How we broke technology barriers, to deliver the world's most advanced 24-bit color board for just $995.



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Why? For the quality design and features described in this ad.

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ColorBoard 264/II For Any Mac II: **$995.**
ColorBoard 264/SE30: **$1295.**

"Millions of colors for millions of people."™



Both the Mac II family and SE/30 version of the RasterOps ColorBoard 264 are fully compatible with Apple's 32-bit Color QuickDraw. RasterOps is an Apple licensed supplier of the Apple 6.0.3 System Software, including 32-bit color QuickDraw. A copy is shipped with each ColorBoard 264.

RasterOps 264 Chip Set

Resulting from many man-years of engineering development time, RasterOps has reduced the large number of components needed (sometimes as many as thirty) to produce 24-bit color video display cards, to a set of two proprietary custom chips utilizing the most advanced VLSI chip design and manufacturing technology. Selecting the most advanced high density CMOS chips throughout, this board has the lowest chip count of any 24-bit card in the industry. The fewer the chips, the less the heat, and more reliable the product.

Dual Oscillators

Two separate oscillators. The left to support Apple's 13" color monitor at a resolution of 640 x 480, and the right oscillator to output 8-bit gray scale video directly to VCRs or TV monitors. It will also output RGB NTSC video for external encoding in 24-bit True Color. When you need video, (and it's coming fast), you're ready.

SetGamma and DirectSetEntries

Your ColorBoard 264 directly supports Apple's DirectSetEntries and SetGamma QuickDraw instructions in hardware. Instantly see the effect of changes to your color image. You can watch the color tones change as you move the mouse. Without this dynamic support, you have to guess at the color correction, enter the new value, and wait for the new screen to repaint. No waiting with the 264.

300 nanosecond Bus Cycle

These 1 Megabit Video RAMs provide more memory in less space, and operate at 100 nanosecond speeds, providing the fastest possible read-write cycles available on the Macintosh, at 300 nanoseconds.

SMOBC Fabrication

We use an advanced, Solder Mask Over Bare Copper board fabrication technology and surface mounting of components through efficient, dependable robotics. Note the clean, simple appearance of this board. When you turn the board over, you will see a smooth golden surface, the trademark of a SMOBC board. It costs more and requires a greater design effort, but the benefit to you is a more reliable board.

RasterOps

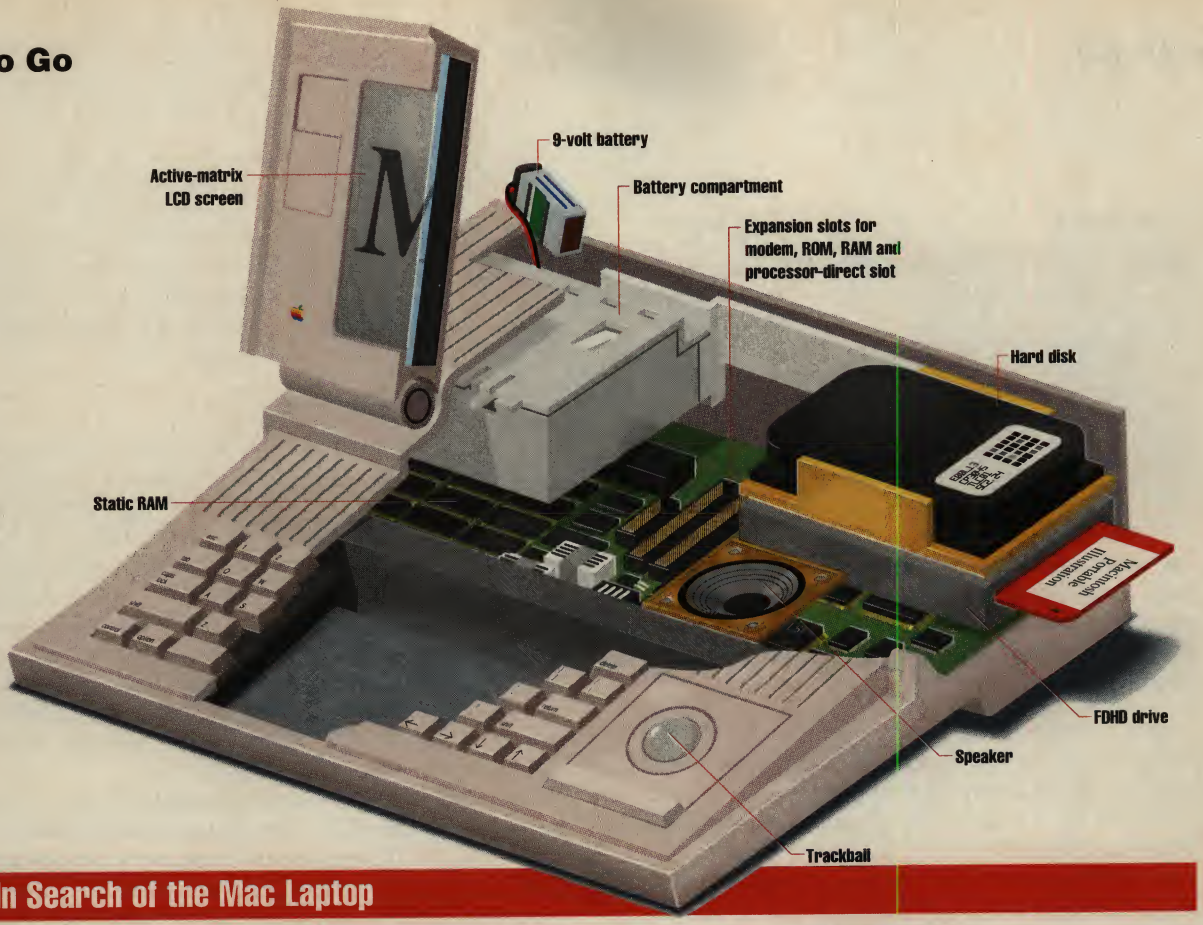
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Mac to Go

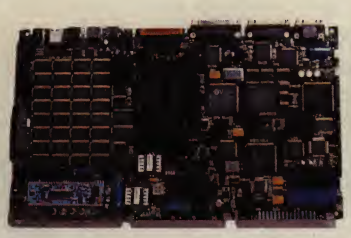


K. DANIEL CLARK

In Search of the Mac Laptop

We've now seen the first of what Apple says is a line of portable Macs. Will future generations be smaller? Can Apple squeeze a real Macintosh to fit into a briefcase?

The Portable's motherboard already uses surface-mounted devices, which save a lot of board space. A surface-mounted resistor, for example, measures only .2 inch, a fraction of the size of a standard through-hole resistor. The board is also fairly crowded, with signal traces covering most of the unused space.



One thing Apple could do is add more layers to the board. The current board has four layers, with traces and parts on the two outside layers and power and ground on the inside. Some of the signal traces could be buried in internal layers, moving the parts closer together. This would also drive up the cost of the board, which is the last thing the Portable needs.

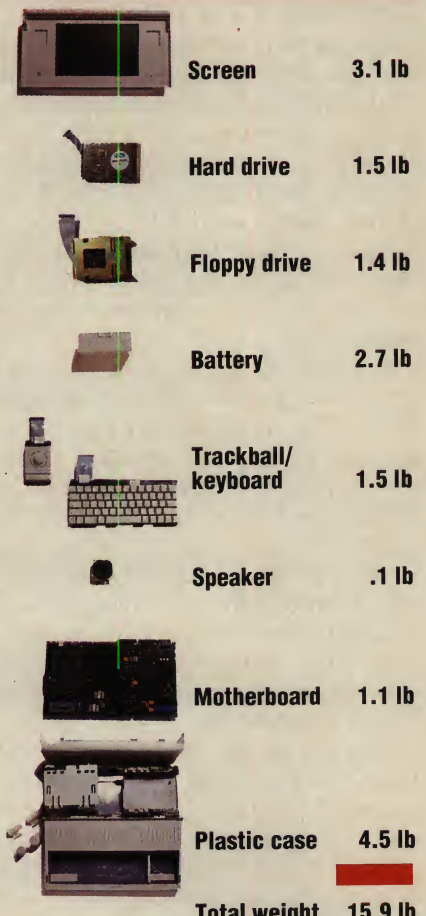
Apple could also add more application-specific integrated circuits (ASICs), which integrate multiple standard parts into a single custom chip. There are several ASICs on the board already, but it is theoretically possible to squeeze the circuitry of an entire computer onto a single chip. This would also increase the production and repair costs because you'd have to replace the whole chip if your modem port failed.

One place where space could be saved is the static RAM, which, even though it is surface-mounted, takes up quite a bit of real estate because it is soldered directly to the motherboard. We wouldn't be surprised if the next Mac portable used all daughterboard slots after vendors start producing RAM boards for the one slot on this model.

A major way to reduce weight and power consumption (and therefore battery size) would be to eliminate the hard-disk drive. This could be done by putting the System and applications on EPROMs and using floppies for files. Granted, it's not all that convenient, but a company, such as Microsoft, could offer preprogrammed EPROMs containing its suite of software.

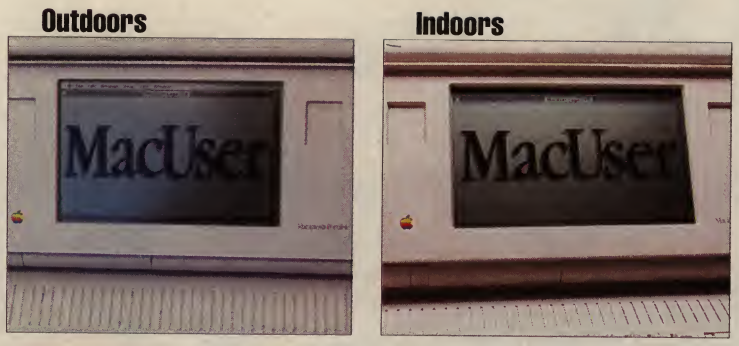
Given Apple's determination to make the Portable a true Mac in every way, we are unlikely to see a smaller high-density floppy that can't be read by other Macs. In addition, we probably won't see a smaller, nonstandard keyboard. Currently, the Portable's width is determined by the size of the keyboard/trackball layout.

The upshot is that although the next Mac Portable could be smaller, given Apple's current design criteria, we aren't likely to see a true laptop Mac soon, at least one that doesn't cost its weight in gold.



Screen	3.1 lb
Hard drive	1.5 lb
Floppy drive	1.4 lb
Battery	2.7 lb
Trackball/ keyboard	1.5 lb
Speaker	.1 lb
Motherboard	1.1 lb
Plastic case	4.5 lb
Total weight	15.9 lb

PHOTOGRAPHY: PETER ALAN GOULD



The Portable uses a 10-inch diagonal screen (640 x 400 pixels), a black-and-white active-matrix flat-panel liquid-crystal display (LCD) that is not backlit. Apple claims the screen has up to five times the contrast of conventional LCDs. Each pixel in the display is controlled by its own on-glass transistor, making the screen reaction very swift.

display, battery, and power management. These advances contribute to performance and functionality as well as, unfortunately, to the high price.

One of the Portable's most crucial components is the 10-inch diagonal screen, a black-and-white *active-matrix* flat-panel liquid-crystal display (LCD) that behaves remarkably like a standard Mac screen. At 640 x 400 pixels, it is wider than an SE screen and the same width and more than three-quarters the height of the standard Mac II 13-inch screen. The screen lacks the strobing or slow fade that sometimes accompanies quick changes (such as cursor movement) on LCD screens common in the DOS world. This improvement results from the sophistication of active-matrix LCD technology, which is more often seen in military components than in commercial portables. Each pixel in the display is controlled by its own on-glass transistor, making the screen reaction swift enough for even the most-challenging HyperCard animations.

The pixels themselves are black, and Apple claims the screen has up to five times the contrast of conventional LCDs. Pixel-edge fill is impressive as well, so that a black area looks solidly black. The whites leave something to be desired, however, as the screen offers an LCD-induced goldish-gray background. There is some contrast loss as you widen the angle at which you view the screen, but the acceptable range is much wider than that of any other LCD screen we've seen to date. The minor troubling aspect of the display is a slight mirroring problem, which comes from pixel-back reflections under certain conditions and results in a small but annoying case of double vision.

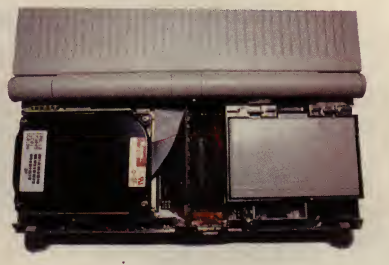
Note that the LCD screen is not backlit but reflective. In good ambient light, it's a winner, but in poor light — sad to say — all bets are off. This was an acknowledged trade-off in a machine designed to run on a maximum of 3 watts, because backlit screens shorten battery life dramatically. Backlighting would also have increased the machine's weight and bulk. It is true that the Mac Portable's screen is better than any nonbacklit screen we have seen in any light. But in genuinely poor light, such as in a coach seat on a red-eye flight or in a darkened lecture hall, you'll be in trouble.

Power Munch

The Portable handles power intelligently and carefully, doling out microwatts at a time, thanks in part to the CMOS technology of the 68000 processor, which requires only a fifth of the power needed by a conventional Macintosh CPU. The battery is rated to last an average of eight to ten hours between recharges. The RAM also requires only low power. The most important player in the power game is a dedicated Mitsubishi 5073 microprocessor with a subset of the 6502 instruction set for monitoring power consumption.

After a period of inactivity, the Portable Mac slips into Rest mode. The processor continues to run but reduces its clock rate from 16 megahertz to 1 megahertz, which saves a lot of juice. For example, suppose you're using a word processor and stop to think about the structure of your next paragraph. The Portable's processor can rest until you start typing again, when it invisibly cycles back to speed — very ingenious.

After an additional user-configurable period of inactivity, the Portable goes into Sleep mode. In this mode, the CPU, screen, and hard drive shut down. But sleep is not death, since memory remains intact. If you have an application running when the Portable nods off, it will be right there when you give the machine a wake-up call by pressing any key. The optional 3.5-inch, 40-megabyte, 28-millisecond hard-disk drive won't restart until it's accessed. It takes the low-power spindle about five seconds to come up to speed. And, in a first for Apple, the hard-disk drive comes preformatted and sporting full system software out of the box.



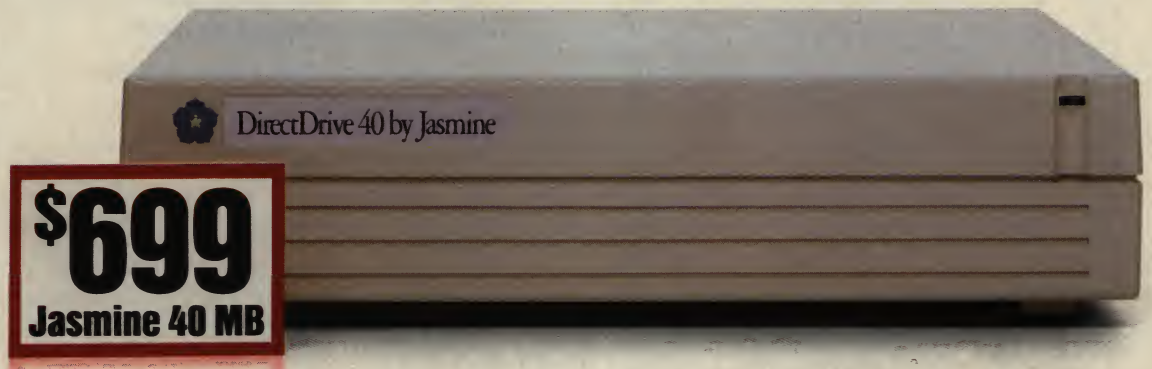
The Portable crams a lot of Mac into a small space. Shown, left to right, are an optional 3.5-inch, 40-megabyte hard-disk drive, RAM and modem boards, and the lead-acid battery.

PHOTOGRAPHY: PETER ALAN GOULD

An elegant, intuitive Control Panel device lets you set the inactivity durations that trigger the Rest and Sleep modes. In addition, you can specify how long the hard disk should wait before it spins down when unaccessed. This feature can save a lot of power: Even at its low-power efficiency, the hard disk is a real power guzzler when spinning.

Main power is provided by a removable, rechargeable lead-acid battery. A second cousin to the battery in your

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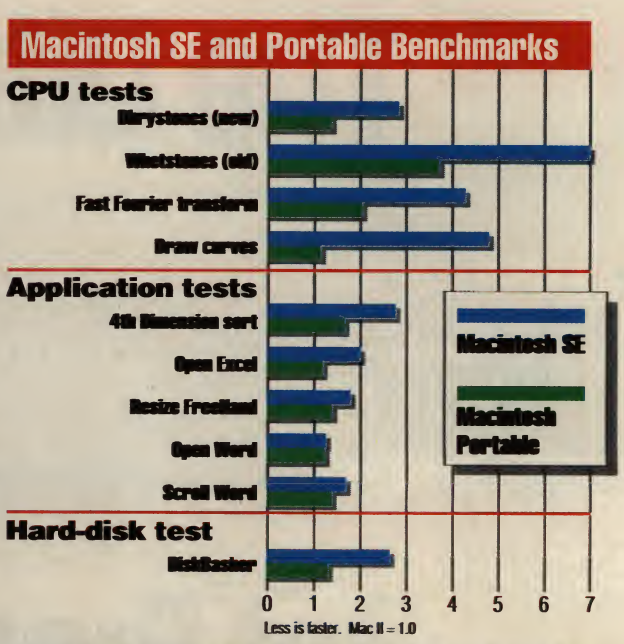


This DA shows how much juice your battery has left. You can also power down to Sleep mode.

car, it can be charged anytime. In this respect, it is preferable to conventional NiCad (nickel-cadmium) rechargeables, which must be completely discharged before they can be fully recharged. Lead-acid batteries lose power gradually, unlike NiCads, which have been known to die suddenly.

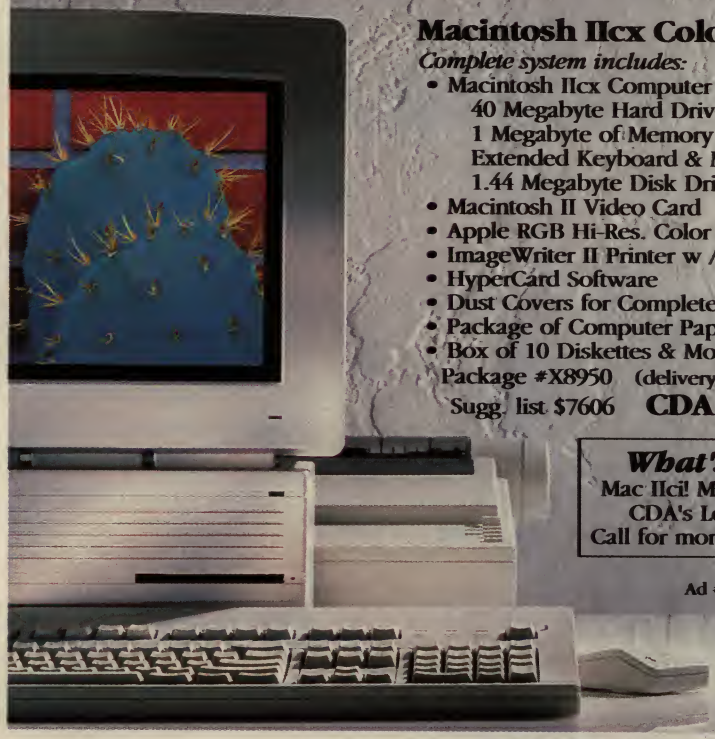
Full battery recharge takes about four hours, and Apple claims a battery can be recharged 200 to 2,000 times, depending on usage and temperature, with the included AC adapter. A standard 9-volt alkaline battery backs up the RAM and clock when you change the lead-acid battery. An external charger accessory for the alkaline battery will be available for maintaining spares.

Apple has taken great pains to avoid sudden battery failure in its Portable. A thermometer-gauge DA lets you



The Macintosh Portable is significantly faster than an SE and often shows performance closer to that of a Mac II. The Mac Portable's hard-disk drive is also an improvement over that of the SE. The Mac Portable and SE had 1 megabyte of RAM, and the II had 5 megabytes.

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know how much power is left, and warning dialog boxes pop up automatically when the power begins to run low. If you're obstinate enough to ignore all the warnings, the Portable will sign off on its own initiative. It bids you good night and then tucks itself to Sleep when its power gets critically low, leaving you about a week to get it to a wall socket. We're talking about recovering data in RAM, remember, meaning the contents of unsaved applications (data on the hard disk is still intact after shutdown, as with any computer).

On-board RAM is static — 1 megabyte's worth is soldered to the motherboard. (We imagine most Portables will be upgraded to 2 megabytes, which will be enough to support a minimum configuration of MultiFinder.) Unlike the dynamic RAM in nearly all desktop computers, which requires constant refreshing, static RAM can remember without refreshment and uses only a trickle of power— roughly a hundredth of that required by conventional dynamic random-access memory (DRAM).

One trade-off you'll face is that the standard SIMMs found in other Macs don't work in the single RAM-expansion slot of the Macintosh Portable. Another is that static RAM is outrageously expensive. When a new dawn in density arrives, expansion of up to 9 megabytes will be possible. How much will 9 static megabytes cost, you wonder? Look, if you have to ask . . . .



The Portable's ports, left to right: video-output, floppy, SCSI, RJ11 (modem), ADB, printer and modem, stereo, and power for recharging the Mac.

PHOTOGRAPHY: PETER ALAN GOULD

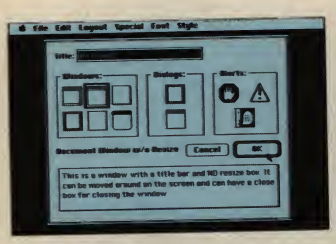
Port Salute

As a full-fledged Macintosh, the Portable has all the connections to the outside world that any other Mac has, so transferring data involves the same connectors and the same cables. There's a SCSI port for attaching hard-disk drives or other peripherals, such as scanners or digitizers, and for connecting to Ethernet. A LocalTalk port (the *printer port* in Macspeak) lets you connect to a network, and there is a companion serial (or modem) port. The standard ADB port is for a mouse, extended keyboard, or other input device.

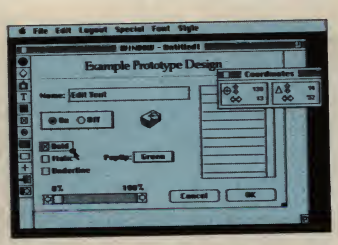
There are four internal bus connectors. As mentioned earlier, one is a RAM-expansion slot allowing for extra memory. Another is an accessory ROM slot that will accept future third-party ROM cards of up to 3 megabytes. At boot-up, ROM cards will appear as volumes on the

"Prototyper makes the process of building a Mac application as easy as it's likely to get."

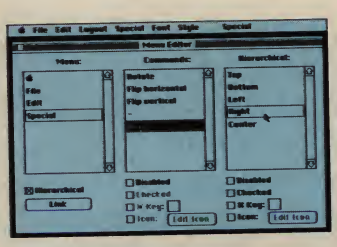
— Dan Shafer, author of *HyperTalk Programming*



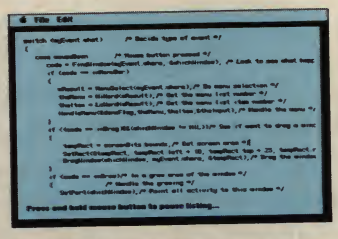
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Portable's desktop. There is also a Processor Direct slot for flexible expansion, similar to the slot in the Macintosh SE but much smaller. Sorry, there's no NuBus capability in the Portable. But for data transfer to the folks back at the ranch, there is a slot for an optional internal 2,400-bps modem, which Apple will offer (no price or release date was available at press time).

The on-board speaker is serviceable; it's certainly not hi-fi, but an 8-bit, 44-kilohertz digital-sound chip will let you hook the stereo output of the Portable to an external boom box. A video-output port requires one of a suite of external converter boxes that will let you output to a standard Apple monochrome monitor or alternatively to NTSC (the U.S. video standard) or PAL or SECAM (international video standards) television monitors. With available plug adapters, you can also recharge the Portable in any country that provides AC from 70 to 270 volts at 40 to 70 hertz.

Carried Away?

So we'll ask the question once again: Is this the machine you've been waiting for? The answer depends on how badly you want it. For some the answer is badly enough to pay the hefty $6,500-to-$7,000 price. Clearly, this is not the Mac for the rest of us.

Our specific complaints? We would have liked a portable that offered its own lights when necessary — a backlight with an on/off switch. It would have been nice if the video output gave access to *additional* desktop space rather than to a second view of the same screen. And, to nitpick, we would have preferred more-easily-switchable keyboard components (Apple currently deems moving keyboard components a task for dealers).

On the positive side, Apple has successfully addressed the initial issues of portable technology and stabilized a new platform on which to build a miniature-Mac future. In comparison with a DOS portable such as the popular Compaq SLT, the Mac Portable fares quite well (see "At a Glance: Mac versus DOS" table). Most important, the architecture of intelligent power management has now been stabilized in a fast Macintosh on a single motherboard of the highest sophistication. In addition to setting the stage for smaller, lighter, cheaper Mac portables, some of this technology will undoubtedly appear on the desktop machines of tomorrow.

Could the Macintosh Portable have been cheaper? Possibly, but not without Apple's sacrificing its commitment to proven, yet state-of-the-art, technology. Could it have been smaller and lighter? Possibly, but not without Apple's sacrificing its commitment to delivering a 100-percent–Mac portable. The bottom line: There are three Mac dynasties — compact (Plus and SE series), modular (Mac II series), and now the first in what will undoubtedly be a long line of portable Macs. For corporate users, the dream of the miniature Mac may have finally come true. Everyman's Mac portable is still on the way.

John J. Anderson is *MacUser*'s senior editor/electronic publishing, and John Rizzo is the magazine's technical editor.

The Third-Party Line

Apple doesn't allow clones, but there are some third-party Mac-portable products. Colby's Walkmac and the DynaMac are repackaged Mac motherboards in small cases. Weighing 15 pounds, the Walkmac SE retails for $5,598 with a hard-disk drive, and the Walkmac SE/30 costs $6,798 with a hard-disk drive. The $7,995 DynaMac with 2.5 megabytes of RAM and a 40-megabyte hard-disk drive is a repackaged SE that weighs 18 pounds.

A big advantage of Apple's Mac Portable over the Walkmac and DynaMac is its long battery life. While the Portable can last up to 15 hours without a hard disk and 8 to 10 hours with it, the Walkmac and DynaMac can hold a charge for only 3 hours.

The Portable's screen is also superior. The Walkmac uses an LCD screen, which, although it's backlit, has much poorer contrast, viewing angle, and speed. For instance, the cursor disappears for a few seconds as it moves across the screen. The DynaMac uses a gas-plasma screen, which is better than the Walkmac's screen but is still no match for the Portable's.

A new alternative to these systems, scheduled to appear early next year, will use a different approach. Instead of repackaging a Mac, the Wallaby Laptop System will use a completely new shell, except for the Apple ROM. Your Mac Plus supplies the ROM, which is reinstalled in the Wallaby.

This leaves you with a ROMless (useless) Mac while you're on the road. In the office, you can connect the Wallaby to a Mac Plus (and later an SE) while using the Wallaby's 15-megahertz 68000 chip in lieu of the 8-megahertz Mac Plus chip.



PHOTOGRAPHY: PETER ALAN GOULD

The Wallaby laptop will use the ROMs from your Mac Plus but operate at 15 megahertz — twice the clock speed.

An option lets you add 16 megabytes of RAM for use as a hard disk. The Wallaby can hold either a floppy-disk drive or a hard drive but not both, and the hard drive is not a SCSI device. There is no SCSI port, but a $95 cable provides one.

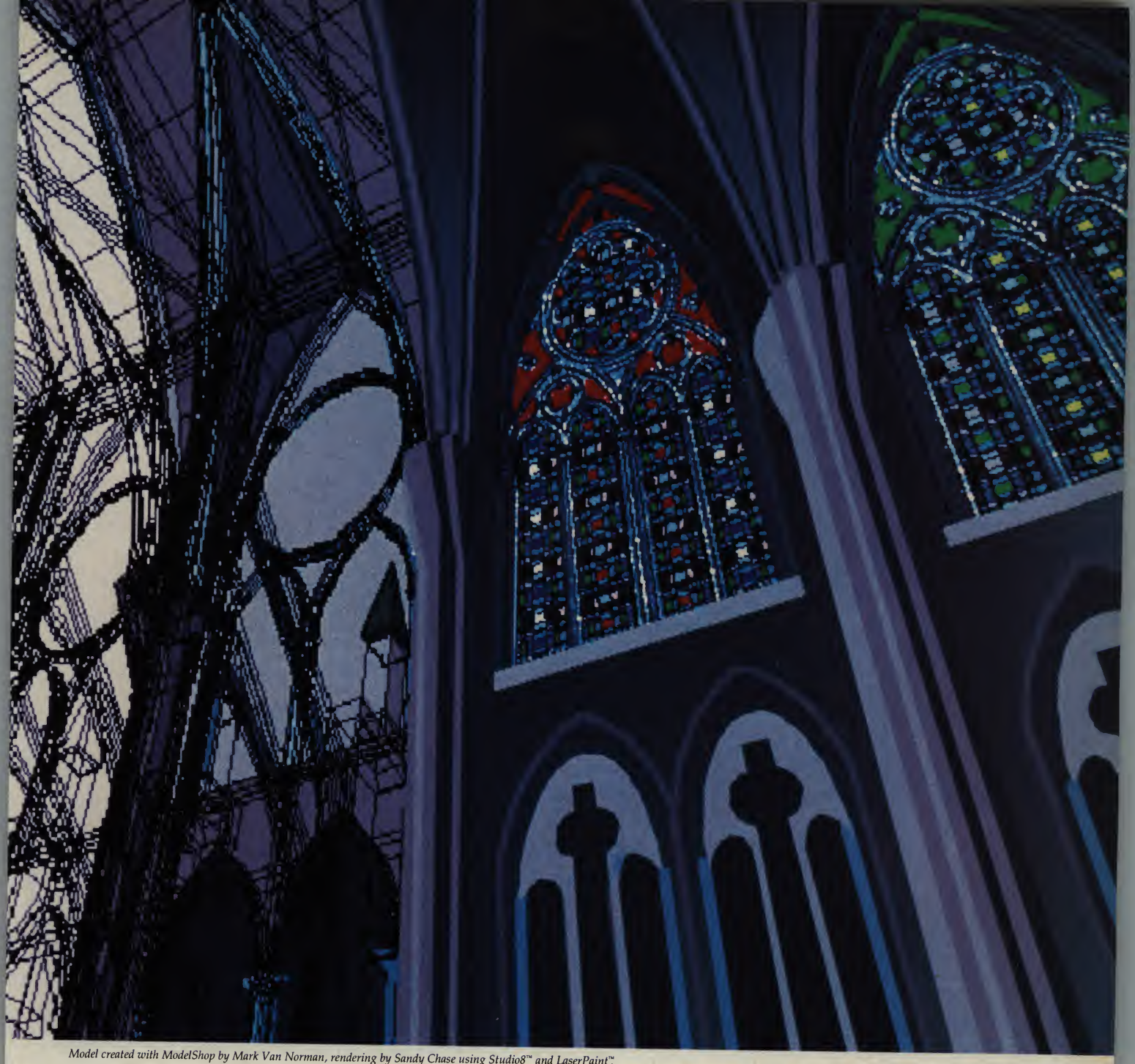
The Wallaby comes with a device called an Isopoint, which is controlled with the thumbs. An optional mouse is $95, but the unit cannot use a standard Mac mouse.

With a price of $3,995, a 20-megabyte hard-disk drive, and a promise to weigh less than ten pounds, the Wallaby sounds attractive. But remember, the real cost also includes the price of a Mac, unless you find used Mac Plus ROMs, which are not legal.

Colby Systems, 4723 N. Warren Ave., Fresno, CA 93705; (209) 222-4985.

DynaMac Computer Products, Inc., Anaconda Tower, 555 17th St., Suite 1850, Denver, CO 80202; (303) 296-0606.

Wallaby Systems, Inc., 2540 Frontier Ave., Boulder, CO 80301; (303) 444-4606.



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In Single File

Managing your data efficiently can be as simple as choosing the right software. Whether you need basic storage or spreadsheet and graphics capabilities, one of these seven flat-file managers can do the job.



A flat-file manager is an invaluable tool for any business task in which information is stored sequentially. Maybe you want to enter bill after bill into an accounts-payable system, keep tax records, or keep an organization's membership and mailing lists.

What if commercially available application-specific software doesn't exactly fit your needs? Or what if you're a tinkerer and would rather do it yourself? You can start with a programming language — such as COBOL, BASIC, Pascal, or C — and write your application from scratch, you can take the middle of the road and customize with HyperCard, or you can use a file manager as a "development kit" and have 80 percent of the work done for you.

The beauty and attraction of file

By Ken Landis



PHOTOGRAPHY: TOM UPTON

managers is that you can use your small investment, usually in the $100 to $500 range, for an unlimited number of applications rather than buying numerous programs, each for a particular task. The file managers available for the Mac offer the same basic functionality: They couple a ready-to-go information-management system with a report writer.

The Mac flat-file–database market can be divided into two categories: desk accessories and full-blown databases. In the DA market, a head-to-head competition between DAtabase and Retriever is in progress (see "The DAs of Flat File" sidebar). The application market is a more crowded field with some familiar names: FileMaker II from Claris, Microsoft File, and RecordHolderPlus from Software Discoveries. There's also Panorama, which replaces ProVUE's OverVUE, and Filevision IV (see "An Objective Approach" sidebar), which replaces Marvelin's Business Filevision.

FileMaker II

FileMaker II (see Quick Clicks, December '88) is a flat-file manager in the classic style. The system uses full-screen entry and can handle multiple font sizes and styles both on-screen and in printed reports. Its excellent use of the Mac interface, combined with strong drawing and graphics-import capabilities, give FileMaker II Claris' distinctive look and feel.

The program's searching function is fast and can span multiple files simultaneously. In less than 2 seconds, FileMaker II can search more than 10,000 records in a single field. It attains its fast search speeds by using a series of indexes that it automatically updates in the background.

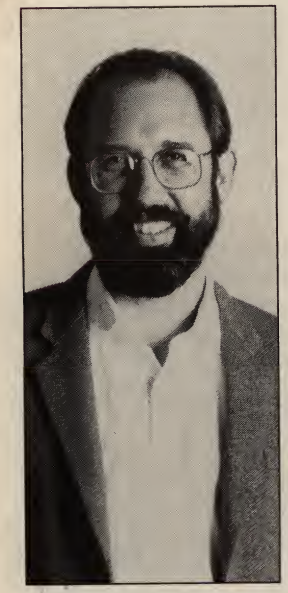
FileMaker II's field types allow a mix of text, numbers, dates, pictures, calculations, and summary data (see Figure 1). Establishing references among fields for mathematical operations is simple, and all formulas automatically update each time a change is made. The formulas can include conditional logic, date arithmetic, and calculations on text values. To make it easier to program field calculations, FileMaker II includes 48 different financial, logical, and statistical functions, much like those used in spreadsheets.

The program provides full WYSIWYG capability for all fields and records. Reports can have automatic page numbering, headers, footers, leading, trailing, and grand summaries. Each field is limited to 32K, and storage and processing constraints are determined by the size of your hard-disk drive.

You can automate repetitive reporting or queries by using a simple, structured script file system. It combines plain-English programming with a built-in capturing mechanism. You build scripts interactively with dialog boxes — you don't have to program or write macros.

FileMaker II includes several helpful functions such as a Refind feature, which remembers your last find

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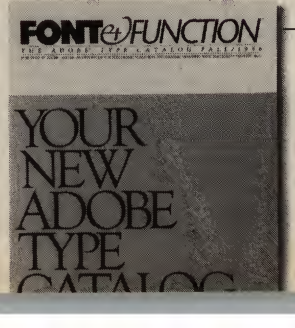
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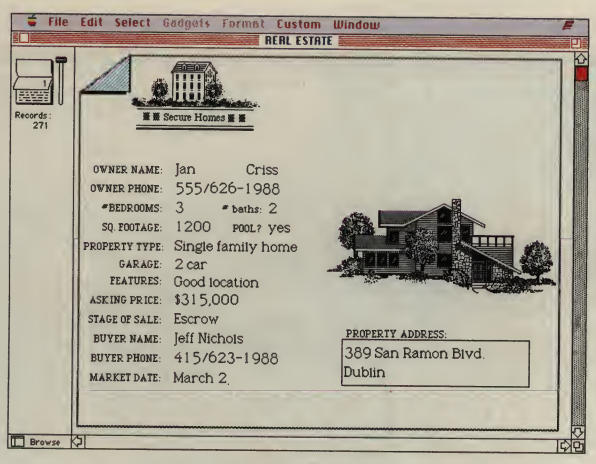


Figure 1: FileMaker II's field types offer a mix of text, pictures, dates, calculations, and summaries. In a real-estate database, you might have a picture of a house in one field, the date in another, and the price in yet another field. And you can vary type style and size.

request, and logical searching with AND and OR statements, which makes it easier to zoom in on exactly the information you want.

The system has its own internal server logic, so it can be used with AppleShare, TOPS, or almost any other network system. It uses record locking and can import and export SYLK, text tab, and BASIC files.

FileMaker II is a solid product for day-to-day use, especially in situations where its network functionality can be exploited.

Panorama

The most visual flat-file manager on the market is Panorama, from ProVUE (see Quick Clicks, June '89). If it weren't for the Mac, this program wouldn't be possible. Panorama, like Retriever, resembles a spreadsheet program, but that's where its similarity to Retriever ends. Like a spreadsheet program, Panorama keeps your database in memory, so all data manipulations are lightning fast.

You can have up to 25 windows and 25 databases open at a time. Of course, 25 windows are more than any mortal can handle, but it's nice to know the capacity is there. You can predefine each window's position and size before opening it, and you can save the window setup along with the database so the windows will reopen in the same locations every time you use the database.

The program offers a background searching technique called Clairvoyance. When you enter a piece of information such as the state name *Massachusetts* into a field, Clairvoyance completes the spelling of the name as soon as you have entered enough unique characters, such as *Mas*. You can turn Clairvoyance on and off at will. Panorama also offers input masks that automatically frame your entries — for example, standard masks for telephone numbers (parentheses around the area code and a hyphen between the prefix and suffix). In fact, the program has the most extensive set of input and formatting tools of any Mac flat-file–management system.

When it comes to analyzing data, Panorama is no slouch either. It has a strong cross-tabulation capability, which you can run on multiple columns simultaneously. The cross-tabbing system is invaluable for anyone who uses a file manager to tabulate data from surveys, interviews, and the like. In addition, the system offers a seven-level Collapse feature that can be used as an outliner.

The program includes a full-function graphics system for producing business graphics such as bar, line, column, area, pie, and scatter charts. Its superb powerful graphics functions enhance its full-featured report writer. You can overlay graphic images onto reports and then output them on a laser printer.

Panorama lets you enter the name of a graphics file in lieu of pasting the file, which means you can reference a suite of pictures frequently without eating up disk and system memory. When the appropriate view of the database is set up, the program automatically retrieves the picture you've specified and places it within the screen setup.

Panorama also offers a macro recorder, which remembers complex series of keystrokes and saves them in a reusable file. Forms set up within the database can even have HyperCard-like buttons added to them that automatically play back the macros (see Figure 2).

On the math side, this spreadsheetlike program can handle any financial equation. As with a spreadsheet program, Panorama has full and fast export capabilities, enabling it to load 10,000 rows of data in less than 60 seconds.

To top it all off, the program offers password protection. Panorama is a well-executed, powerful, easy-to-use, highly graphic flat-file manager that is really a flat-file manager and spreadsheet program combined.

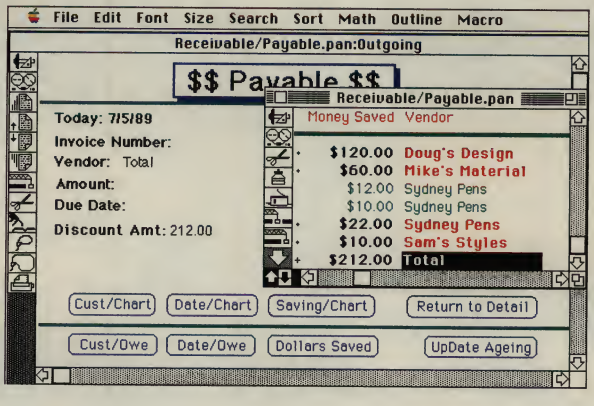


Figure 2: This Payables form from Panorama has buttons for running analysis macros. The Data Sheet window shows records summarized for early payment. One record, Sydney Pens, has been expanded to show detail.

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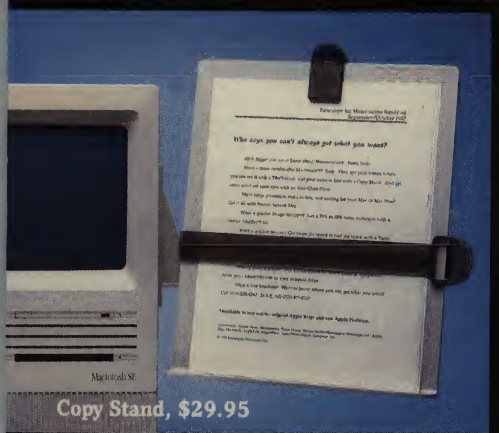
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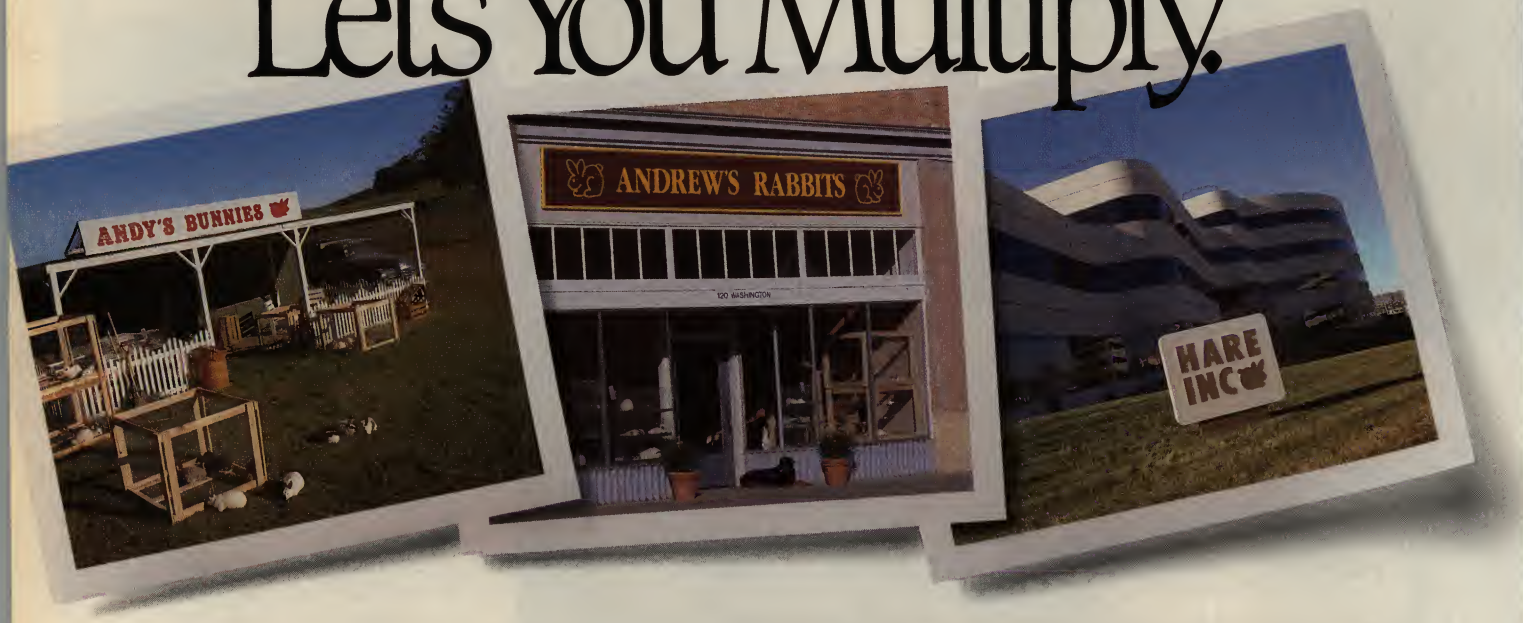


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Microsoft File

Microsoft File is FileMaker II's major competitor. The product, which has been around as long as the Mac, offers a lot of features in a low-cost package. It has multifont WYSIWYG capability; a feature called AutoMac III for easy automation of repetitive tasks with a command-capture system; and a full-function report writer that includes headers, footers, subtotals, and totals.

The program comes with more than 100 ready-to-use office-form templates, which are designed to work

The DAs of Flat File

DA file managers spruce up your Mac's data-management capability. They provide a quick and easy, centrally located store of information. DA file managers typically hold names and addresses, expenses, and other information you might want to access when you're using a word processor or a spreadsheet program.

Retriever, from Exodus Software, is a classic example of DA design. The system provides full add, edit, browse, and print functions. It has a text-file–export capability and provides HyperCard stacks that can read your Retriever files.

The system uses a row-and-column format for data storage, much as a spreadsheet does. Each row is a record, and each column is a field (see Figure A). The intersection of a row and a column is called a cell. Each cell can hold up to 254 characters, and each file is limited to 64 columns, or fields.

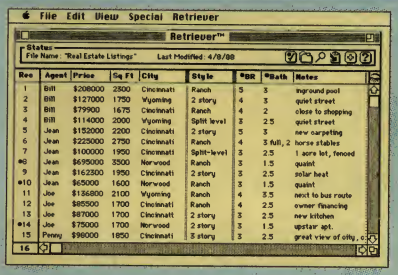


Figure A: Retriever works somewhat as a spreadsheet does. Each row is a record, and each column is a field. Instead of pull-down menus, Retriever uses icons to activate functions. From left to right, the functions are Mark, Sort, Find, Copy, Add Record, and About Retriever.

Entering data is straightforward: you type it row by row, column by column. Retriever makes standard use of the Mac interface for window sizing, scrolling, and the like. It uses icons in lieu of pull-down menus to activate its functions. Click on the Sort icon to sort on any column within the file in either ascending or descending order or by alphanumeric or integer values.

Find is a standard match search that starts in the first column and goes through a file column by column until it finds a match or reaches the end of the file. You can save time and force it to start at the head of any column just by clicking on it. Unfortunately, Find doesn't have any soundex (phonetic) searching capability.

You can mark any record or field for printing or for selective saves by double-clicking on it. You can print the entire file or only those records you've marked.

Retriever offers a Hide feature that can temporarily hide columns in much the same way as such features work in spreadsheets. Hide is useful for creating smaller views of your data that always display critical information, with the background information suppressed until you need it.

Because it loads files into memory, Retriever works at a healthy pace. And as any DA should be, it's easy to use, fast, and helpful to have around.

DAtabase, from Preferred Publishers (see Quick Clicks, July '89), is intended for Mac and DA novices on up. The software and the documentation assume you have no Mac or DA knowledge. Starting with a full Mac glossary and a lengthy description of DAs and file management, you progress to basic program operation.

DAtabase is a full-screen record-driven program. Unlike Retriever, which uses rows and columns, it uses single full-screen records superimposed on a background form. Each file can have a unique background that you create with any program that produces MacPaint-compatible files.

Once you've loaded the background image, you enter alphanumeric fields onto it to create the file structure. You also have control over text-field placement, font size, font style, justification, and color. Each field can have a unique pop-up list associated with it to make data entry a snap. And you can set up many calculated fields for each record. You can create simple billing systems or complex invoicing systems by using stacked calculated fields (see Figure B).

Once its file structure is established, the system provides basic viewing, sorting, searching, and printing functions. Unlike Retriever, which searches through an entire file unless you force it to start on a specific column, DAtabase uses a dialog-box approach that lets you specify the field you want to search as well as the value(s). The search is case-sensitive, but the system cannot perform soundex searches.

System navigation is done with pull-down menus. DAtabase provides a full on-line help system and a built-in automatic phone dialer.

The system makes good use of the Mac interface. Its graphics capabilities are unconstrained, with full support for text layout and background enhancement. You can choose to print only selected records, and you can include background pictures, page numbers, and record borders.

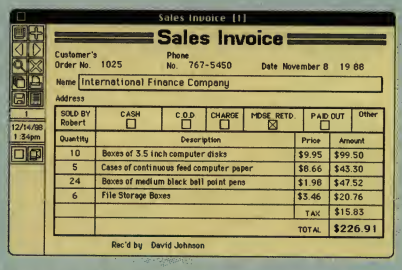


Figure B: DAtabase lets you create simple files containing records such as this one or complex invoicing systems that use stacked calculated fields. Each file can contain up to 2,500 records. The icons' functions include View by List Window, Last Record, New Record, Previous Record, Next Record, Search, Delete, Sort, Print, Open Another File, Preferences, Mark/Unmark Records, and Delete All Marks.

DAtabase includes a file-export capability; a database converter that converts text, scrapbook, PictureBase, and QuickDEX files to DAtabase file format; and an FKey to Xtra kit that lets you connect any Fkey on your system to a DAtabase-system feature. Fkeys included with the program are a phone dialer, a paint grabber for MacPaint files, and a text grabber for use with the Clipboard. The documentation includes full instructions on how to add Fkeys and how to write interfaces for your own utilities.

DAtabase takes full advantage of the Mac. Its background, graphic, and color capabilities — as well as its interactive nature — make it a pleasure to use.

In Single File

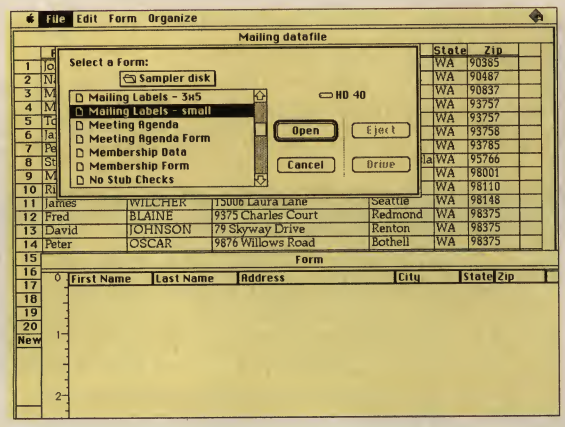


Figure 3: Microsoft File comes with more than 100 ready-to-use office-form templates. You can select the form and use it as is or customize it with imported graphics.

with many standard Deluxe Computer Forms & Supplies preprinted forms as well as with Avery computer forms. You can use any of the templates as is, or you can customize them with graphics developed with another application (see Figure 3). Microsoft File has no built-in graphics-generation or -editing abilities.

As you would expect, the program's integration with Word and Excel is seamless. File provides excellent support for generating all kinds of forms and mailing labels and has full computed-field capability, field borders, and a hide-record capability that makes browsing through the database less of a strain on the eyes.

A complaint about earlier versions of File was that they were too slow. To speed up performance, Microsoft has now included a full background indexing system. Other recent enhancements include multiuser network support (file locking); window zoom boxes; date arithmetic; and a report-summary style feature that allows you to assign styles such as italics, bold, or underline to the summary sections of your reports.

Microsoft File is the old, dependable, solid product in the file-manager market. It runs faster in its new version, but it still won't break any speed records. It has good reporting capabilities, but it doesn't set the market standard. It's simply a good product for a good price. Its key competitive advantage is its form-template library: That's probably the only reason to buy it rather than any of its competitors.



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An Objective Approach

Filevision IV, from Marvelin, does what DAtabase does for graphic images, and more. It's a combination file manager, integrated imaging system, and object-oriented database. In an object-oriented database, you can look not only at the information in the traditional field-and-record format but also at objects that are connected to other objects, such as graphics to text.

Think of Filevision as a graphic database manager. Its strengths are its state-of-the-art integral graphics-generation and -editing systems and its ability to relate graphics to text (see Figure A). The application is designed to leverage the Macintosh's graphic-generation, -display, and -manipulation capabilities. At least 80 percent of its cost and value is in its graphics ability. Filevision IV pays off when you need desktop-publishing–level graphics and midrange stand-alone file management.

The program comprises a 32-layer graphic database in which each layer can be linked to its own textual database. You can create up to 32 databases within one file, and each database can have a unique record format. Each object (or group of objects) on the drawing page is connected to its own database record. A double-click accesses its record or its link to another file. Graphics can be imported or scanned.

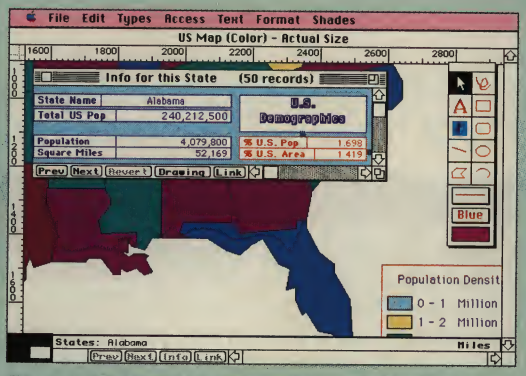


Figure A: Filevision is a good choice for projects that require the integration of graphics and text. Here the graphic map is overlaid with the information window. Each graphic layer can be linked to its own textual database, and one file can contain up to 32 databases.

On the text side, Filevision offers multiple computed fields, a three-level sorting system, and a range of statistical functions. Operationally, it runs smoothly and is enjoyable to work with. The system offers full on-line help screens to guide you through its plethora of functions.

Filevision IV should be the choice for applications in which the integration of text and graphics — for sales reports, personnel uses, or inventive applications such as combining shipping information with graphic representations of products — can justify the system's price.



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RecordHolderPlus

RecordHolderPlus is in the middle of the road when it comes to functionality and performance. In some categories, it's a little better than its competitors; in others a little worse.

Basically, the product uses full-screen entry and a standard Mac interface. Its strength is in its editing capabilities — here, RecordHolderPlus does stand alone. It offers range

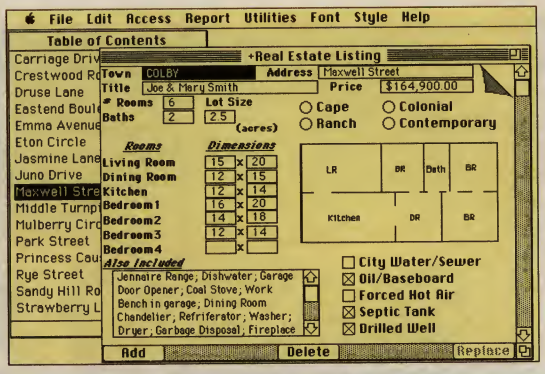


Figure 4: With RecordHolderPlus a real-estate listing looks the same when it prints as it does on-screen. The Table of Contents window gives you a quick way to find files.

A Dynamic Connection

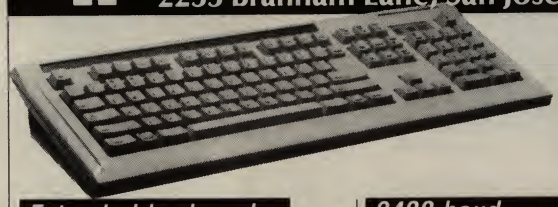
Sometimes a flat-file manager just won't do the job, and you have to trade its ease of use for the dynamic connections of a relational database. A relational system offers more-efficient data storage. Information such as name, address, and phone number is stored in one file for access by all the files that need that information. Using that file may be as easy as entering a customer number into an invoice, which feeds the person's data into the invoice, thereby saving space and avoiding duplicate data.

Another advantage of a relational database is the provision of a programming language. Relational databases don't have to have programming or procedural languages, but the most-powerful ones, such as 4th Dimension and Omnis 5, do. Languages let programmers automate functions, customize the interface, and give users a product that is more sharply defined to meet their particular needs.

High-end relational databases add another feature that is critical in a corporate setting and that most flat-file databases (other than FileMaker II) don't have: true file- and record-locking capability. This feature makes the database truly multiuser and ensures that only one copy of the database is maintained.

— Laura Johnson

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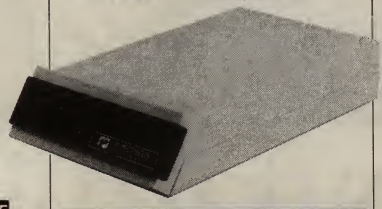
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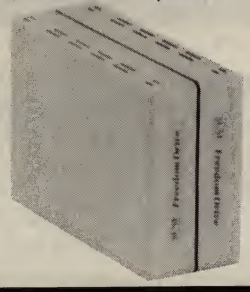


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65Mb	40Ms	$549
85Mb	28Ms	$499

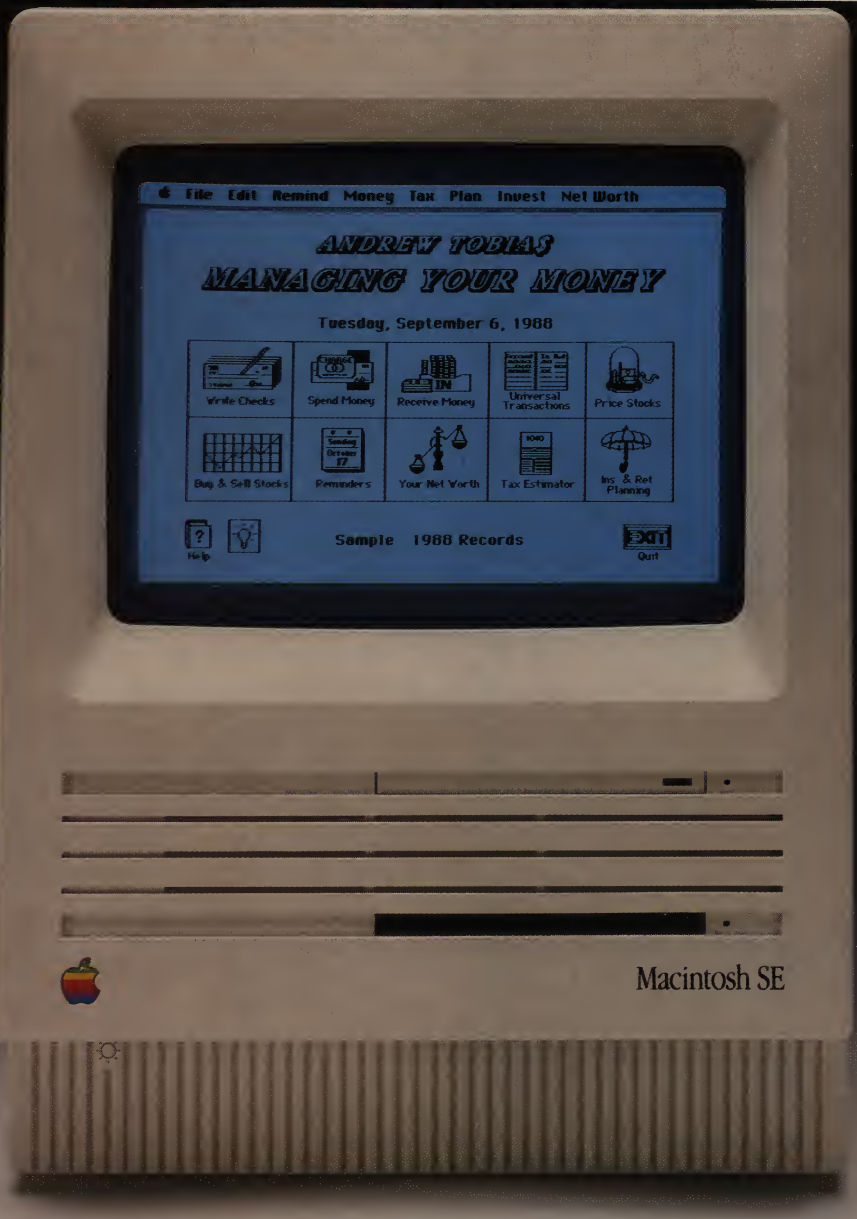
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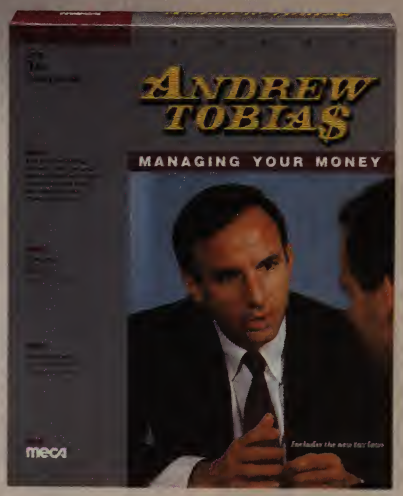
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checks, alphanumeric field checks, uppercase conversions, pop-up field lists, and preset punctuation patterns.

The system performs well in standard file manipulations. Its report writer uses a WYSIWYG method, and its report-writing capabilities are on a par with those of Microsoft File — simple and effective.

To navigate the system, use the file directory, called the Table of Contents window (see Figure 4). The window shows what records are in a file and lets you enter, browse through, and find a particular record. It's a visual directory of the file.

RecordHolderPlus offers a competitive computed-fields capability, logical-searching abilities, line and box drawing for reports, file-level password protection, multiple date formats, and a good solid manual. The system has a degree of popularity because it's easy to use, but the ease of use comes at the expense of powerful capabilities that shouldn't have been excluded, such as multiple-file searching and a macro capability.

Ken Landis has used Apple computers since 1978, solving problems for businesses from proprietorships to major corporations.

Report Cards

DAtabase ★★★★½

A flat-file manager in a DA. Handles pictures, text, and numbers with ease. Supports color. Converts QuickDEX and other files. Version 1.12. Requires 512K or later. Preferred Publishers, 5100 Poplar Ave., Suite 706, Memphis, TN 38137; (800) 446-6393 or (901) 683-3383.

Price: $129.95

FileMaker II ★★★★½

A solid development-oriented multiuser flat-file manager, ideal for business environments. Has flexible layouts, hierarchical menus, and good searching and reporting capability. Supports color. Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052-8168; (408) 987-7000.

Price: $299

Filevision IV ★★★

A file manager that thinks in pictures more than in text. The choice for projects involving integration of graphics and text . Supports color. Doesn't stack up well in straight-text uses and wasn't meant to. Version 1.0. Requires Mac Plus or later. Marvelin Corp., 3420 Ocean Park Blvd., Suite 3020, Santa Monica, CA 90405; (213) 450-6813.

Price: $495

Microsoft File ★★★

An old program that has been rejuvenated and is OK but not a trendsetter. Its biggest strength is its more than 100 form templates that work with standard preprinted business forms. Version 2.0. Requires 512KE or later. Microsoft Corp., 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717; (706) 882-8080.

Price: $195

Panorama ★★★★½

Replaces OverVUE. Keeps databases in RAM for speed and has spreadsheetlike data entry. Supports text, numbers, graphics, and dates as data types. Color, powerful charting function, and macros. Version 1.1.1. Requires 1 megabyte and one 800K drive. ProVUE Development, 15180 Transistor Lane, Huntington Beach, CA 92649; (714) 892-8199.

Price: $395

RecordHolderPlus ★★★

A middle-of-the-road program with average functionality that offers excellent editing functions. Good for high-volume applications in which editing is important. Supports color. Version 3.1. Requires 512K or later. Software Discoveries, Inc., 137 Krawski Drive, South Windsor, CT 06074; (203) 872-1024.

Price: $99.95

Retriever ★★★

A spreadsheet-oriented DA flat-file manager that has solid reporting and uses icons instead of menus for many functions. Has fast sorting and decent searching capabilities and a HyperCard interface. Version 1.03. Requires 512K or later. Exodus Software, 8620 Winton Road, Suite 304, Cincinnati, OH 45231; (513) 522-0011.

Price: $89.95

The Bottom Line

As you've seen, the Macintosh flat-file–management market is crowded, diverse, and broad in terms of price and functionality. Which program is best for you?

FileMaker II is a solid development-oriented file-management system, perfect for building entry screens, creating reports, and running queries. Its multiuser capability makes it a natural for business tasks in which data goes in and comes out all day long.

If you can't decide whether you need a spreadsheet program with good data-management capabilities or a file manager with good calculation abilities, Panorama is the perfect choice. This product successfully spans both areas. Its file-management capability is exponentially greater than its spreadsheet capability, but few users will notice the missing statistical, financial, and other functions included in spreadsheets. Panorama is not for run-of-the-mill file management; it is intended for heavy analytic or presentation applications.

Microsoft File's niche is for managing information that goes onto business forms. The product's more than 100 ready-to-use office-form templates make it a natural for tracking shipping information, customer orders, and so on. For any task related to its form library, the system can't be beat. But FileMaker II is a better bet for building applications from scratch.

The main plus in RecordHolderPlus is the novel way it lets you browse through and enter a file by using the Table of Contents window. And at $99, it's the least expensive of the products described here. If you need a system that offers foolproof navigation and bare-bones functions, it's a good choice. Otherwise, you're better off with FileMaker II, if you want an application, or Retriever, if you want a DA.

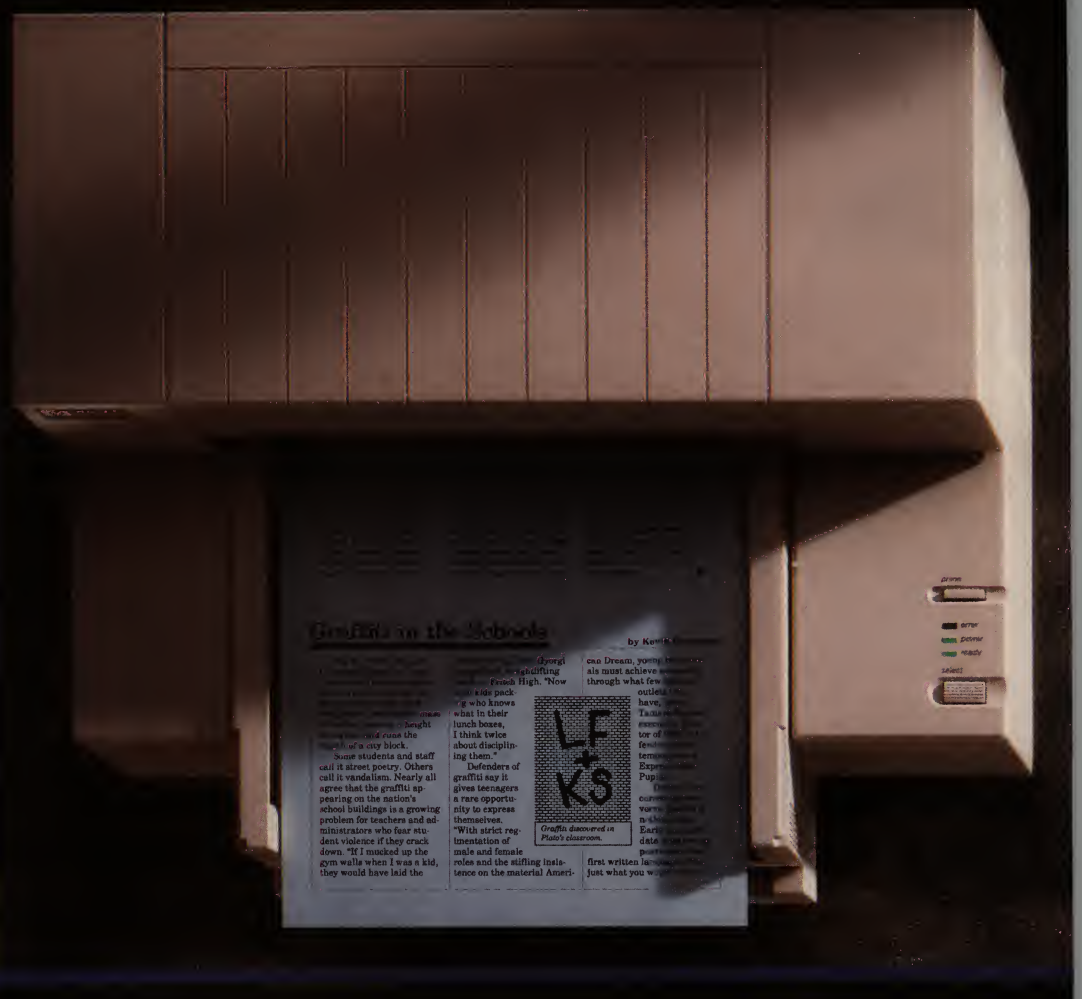
Filevision IV offers the most impressive integration of graphics and text of the products discussed here. In fact, its graphics capabilities border on those of desktop-publishing software. This program is the best choice for managing CAD/CAM graphic libraries, scanned images, and the like; it's not for analyzing data, creating reports, or storing information.

In the DA market, Retriever offers solid functionality as an adjunct file manager. It should be used for day-to-day information-management and -retrieval tasks such as maintaining customer lists, employee information, product data sheets, and the like. DAtabase offers the same functions as Retriever, plus graphics integration both on-screen and on hard copy. It's the perfect product to use when you want visual punch or need to keep track of linked graphics and text.

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Letting in the Light

Debunking the myths of optical discs and revealing the real reasons why you should be interested

By John Rizzo

Let's face it — lasers are hot. Used until recently only by scientists for things such as eye surgery, Star Wars, and ultraprecise measurement and calibration at the National Bureau of Standards, lasers are now finding their way into millions of homes through boxes that read shiny plastic discs. In 1988, audio compact discs outsold vinyl 33-rpm records by 2 to 1, much as 33s had long ago replaced 78s. The reason



for this is simple: Optical discs hold more music at a higher fidelity than do LPs, they're small, and they're virtually indestructible. So it seems logical that laser optical discs will soon replace the hard disks connected to our Macs, right?

Don't put any money on it. For most users, they're neither an alternative to hard disks nor viable backup media. It's not that optical discs are a fad; on the contrary, optical discs are probably where audio CDs were in the music market six years ago. It's just that claims that optical technology is taking over the market are a symptom of nearsightedness. Hard disks did not replace floppies but added a new dimension to desktop computing. Similarly, optical discs will perform new tasks not yet common on desktop computers, replacing noncomputer technologies such as microfiche. Optical discs are the last piece of a technology jigsaw puzzle that is already being used to revolutionize the way some companies operate.

Many optical technologies are in development, but three types of optical discs have hit the mainstream market: CD-ROM (compact-disc–read-only memory), WORM (write once, read many), and erasable. They're not compatible with each other, but then, your VCR doesn't play audiocassettes either. Each is suited for particular jobs and users, which I'll identify as I give you a look at a representative sampling of some of the dozens of optical-disc drives available for the Mac.

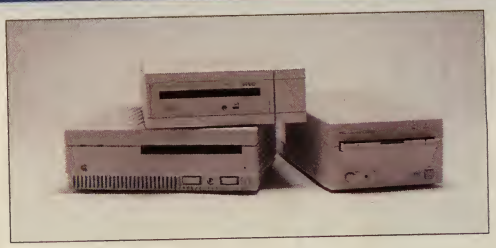
Read (Only) Me First

CD-ROM is the oldest desktop optical technology and has the most-developed standards, giving CD-ROMs portability among different drives and computers. The two main standards are the High Sierra standard and the International Standards Organization (ISO) standard, which grew out of High Sierra. If drive and disc vendors implement the standards, a disc can be shared among PCs and Macs by using one set of data but two sets of header and driver information. Most CD-ROM drives can even play audio CDs, which are the same size.

Enthusiasts are excited about CD-ROM technology because it provides a great distribution medium. A disc can hold 650 megabytes of data, is compact (4.75 inches in diameter), and is an enduring storage medium. Discs are also not all that expensive to produce. A 100-disc pressing can run about $3,000, with per-disc costs decreasing with increasing production volume. On a dollar-per-megabyte basis, CD-ROM is not a bad deal for software publishers, especially if they have a lot of software to publish. These costs are likely to come down further with the appearance of CD-ROM–mastering service bureaus. For about $150,000, small businesses can offer data capture, editing, indexing, formatting, encoding, and output of CD-ROM discs by using the TOPiX CD-R system from Optical Media International of Los Gatos, California. (For information on other CD-ROM mastering systems, see "Optical Horizons," June '88.)

But despite all these benefits to users and disc publishers and even though drives have been on the market for several years, CD-ROM technology just hasn't taken off yet. According to InfoTech, a consulting and research firm, there were approximately 170,000 CD-ROM drives on users' desks last winter — that's less than 1 drive for every 100 to 150 PCs. CD-ROM penetration is even lower on the Macintosh side, with 5,000 to 15,000 drives working with some 2.5

CD-ROM Products



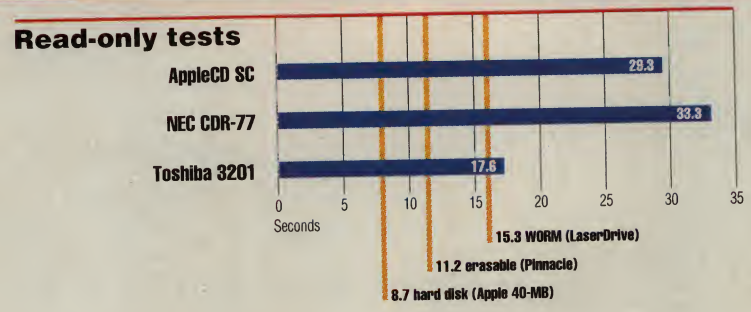
The most important facets of a CD-ROM drive are speed, price, and size. The Toshiba TXM-3201A1-Mac CD-ROM drive is ahead of the AppleCD SC and the NEC CDR-77 on all three counts.

CD-ROM drives are very slow — slower than erasable and WORM drives, slower even than floppy-disk drives. The Toshiba drive, touted as the fastest CD-ROM drive on the market, performs almost twice as fast as the NEC, the slowest of the three. My read-only benchmark consisted of opening a 4.6-megabyte HyperCard stack (using version 1.2.2 of HyperCard).

The AppleCD SC is the best drive for audio in hardware and software. All three drives can play audio CDs with the Mac running, and they come with front headphone jacks and volume control. The Toshiba drive lacks rear stereo jacks and a three-position switch for volume control, but those features are not worth paying $400 more for, for the Apple or the NEC.

The AppleCD SC is the only drive of the three designed to fit under a Mac SE. It would be a better value if the price were lower. For now, the Toshiba drive is the clear choice.

CD-ROM Benchmarks



Time taken to open a 4.7-megabyte HyperCard stack

CD-ROM Guide

AppleCD SC
Comments: AppleShare file-server support; RCA and miniheadphone stereo jacks.
Manufactured by: Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.
Price: $1,199.

NEC CDR-77
Comments: RCA and miniheadphone stereo jacks.
Manufactured by: NEC Home Electronics (USA), Inc., 1255 Michael Drive, Wood Dale, IL 60191; (312) 860-9500.
Price: $999; driver software, $199.

Optical Media International ProCDP
Comments: Rack-mounted metal case for music studios; .25-inch headphone stereo jacks.
Manufactured by: Optical Media International, 485 Alberto Way, Los Gatos, CA 95032; (408) 395-4332.
Price: $1,795.

Toshiba TXM-3201A1-Mac
Comments: Faster Toshiba model; miniheadphone stereo jacks.
Manufactured by: Toshiba America Information Systems, Inc., 9740 Irvine Blvd., Irvine, CA 92718; (800) 456-3475.
Price: $870.

Toshiba TXM-5100A-Mac
Comments: Slower Toshiba model; miniheadphone stereo jacks.
Manufactured by: Toshiba America Information Systems, Inc., 9740 Irvine Blvd., Irvine, CA 92718; (800) 456-3475.
Price: $650.

PHOTOGRAPHY: PETER ALAN GOULD



"Cirrus Drives-the cream of the crop."

Macworld, May 1989

La Cie products are the choice of professional critics and critical professionals. But don't take our word for it, take Macworld's, MacUser's and La Cie customers. You will find that La Cie creates the standards for excellence.

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Macworld, May 1989.

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84	15	999
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138	15	1,499
172	15	1,799
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1038	15	5,199

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Macworld, September 1989.

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Macworld, September 1989.

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Optical Discs at a Glance

	CD-ROM	WORM	Erasable
Best uses	in-house data distribution retail data and software distribution	on-line archiving secondary mass storage	document processing secondary mass storage data acquisition
Good points	industry standards among vendors holds 650 MB	data stable up to 100 years writes once holds up to 1 GB	rewritable holds up to 1 GB
Bad points	very slow	writes only once	very new technology

million Macintoshes, according to industry sources. What's wrong with this picture?

CD-ROM discs are read-only, but that limitation hasn't prevented audio compact discs from obtaining market success. One problem with CD-ROM drives is their performance, which is even slower than that of floppy-disk drives. Nevertheless, no one has abandoned floppy-disk drives completely, because they are still useful for loading and backing up files and programs. The main roadblock is the old chicken-and-egg syndrome that plagues any new distribution medium: Users are waiting for a reason to buy a drive (that is, published titles), and developers are waiting for a reason to publish (that is, a large installed user base). Some large companies have created their own titles, using CD-ROMs to distribute database information such as company statistics and customer lists. In fact, most drives now are being used by large companies. For a company spread out over several states, having its own CD-ROM distribution system is less expensive than creating a giant network.

It will take a good bit of innovative third-party publishing to make CD-ROM drives as common as printers in offices.

Actually, use of the drives is starting to become more widespread. CD-ROM telephone directories are sprouting up, and Digital Electronics is putting its VMS operating-system documentation onto CD-ROMs. For desktop publishers, there are discs full of clip art. There's even a disc to help you create, master, and publish CD-ROMs: CD-ROM Developers Lab from Software Mart of Austin, Texas.

CD-ROMs on the Mac offer combined text, graphics, and sound. The *Whole Earth Catalog*, that Sears catalog of the counterculture, is now available as a CD-ROM HyperCard stack from Broderbund of San Rafael, California. Apple advocates are using HyperCard as a front end to the large amounts of data on CD-ROMs. The Whole Earth disc features scanned photographs and diagrams from pages of how-to books, indexes by section and by word, and music. Click on a button, and you get a 60-second sample of the recording you're reading about.

For those of you in the market for conventional business applications, Microsoft has a disc for which it might be worth buying a CD-ROM drive. The Microsoft Office is a single disc containing Word, Excel, Mail, and PowerPoint. On-line documentation includes animated help sequences with sound and the ability to search disc files by word. The disc also includes a variety of third-party software, such as Excel templates from Heizer, Silicon Beach's SuperPaint, and 350 Adobe fonts. At $949, it is quite a savings over the price of the products separately.

But whether CD-ROM technology will take charge in the computer market the way its audio counterpart did in the consumer market is still a matter of speculation.

WORM and Erasable

WORM and erasable discs are in a different market altogether. Unlike CD-ROMs, their main purpose is not to serve as distribution media but instead to be used for mass storage. They're big, removable, and stable. And you can write data to them.

Each type of optical disc comes in a 5.3-x-6-inch cartridge. Most of the double-sided cartridges hold 650 megabytes per side, and gigabyte sizes are becoming more common. Most WORM and erasable drives produced for the Mac also work with a PC, the difference being only in the driver software. However, most cartridges from different vendors are incompatible with each other and between Macs and PCs because neither of the technologies has standards such as those that CD-ROMs enjoy.

WORM is the older of the two technologies; it started on mainframes and then migrated to desktops (see "Optical Horizons," June '88). By contrast, the first erasable drives were introduced this year. Most erasable drives use optical assemblies from one of two OEMs—Ricoh and Sony. Maxtor was getting ready to ship its own assembly in August.

Last year, Steve Jobs made a big stir in the optical-drive industry by announcing that his NeXT computer would come with an erasable optical drive. Since then, the erasable market has exploded, with some 15 drives for the Mac, and more on the way. Many people predicted that the advent of erasable technology would be the death knell for WORM optical



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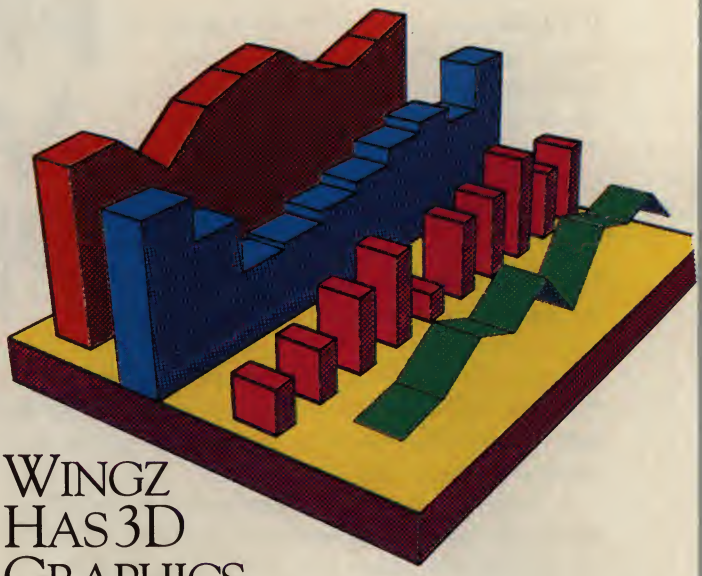
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For example, to hide the cell grid with Excel macros would require:

=DISPLAY (false, false, true, true, 0)

To perform the same action in HyperScript:

HIDE CELL GRID

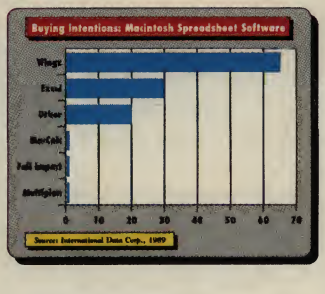
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User Satisfaction	
Rank	Spreadsheet
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2	Excel
3	Full Impact
4	Other
5	MacCalc
6	MultiPlan

According to International Data Corporation (July, 1989) Wingz ranked number one in user satisfaction among Macintosh spreadsheet users.

WINGZ HAS FUTURE USERS.



The same survey found Wingz an eye-popping two-to-one favorite when users were asked which spreadsheet they intend to buy in the next six months.



WINGZ HAS BUTTONS.

Northeast	8,098	9,133	9,318
South	5,037	6,001	4,674
Midwest	9,515	8,323	8,759
South	6,976	4,898	1,306
Northwest	4,074	1,644	2,694
West	9,349	9,157	4,423
Totals	43,048	39,156	31,175

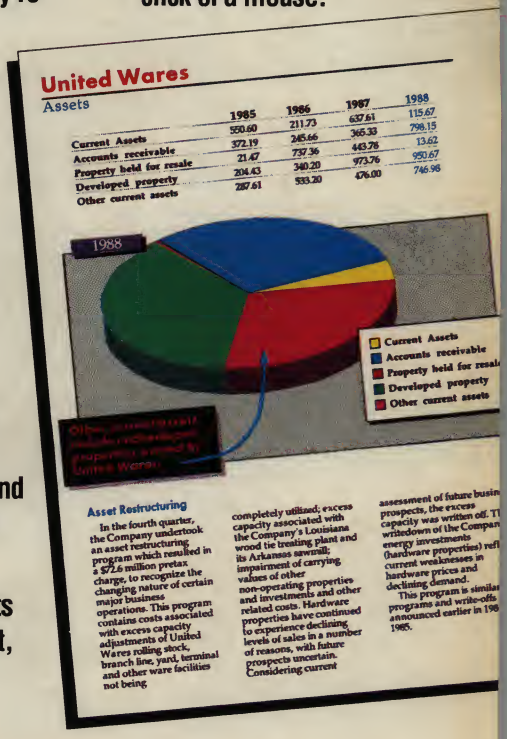
Consolidate Revenues | Consolidate Expenses
Print Revenue Report | Print Expense Report
Hide Chart | Show Chart

Buttons can make your spreadsheet as easy and natural to use as the radio or the dishwasher. They're easier and faster than menus or typing in commands. (You can also put other Macintosh controls, including radio buttons, check boxes and slide bars, directly onto the worksheet.) Just as important, buttons unleash the power of HyperScript. So you can attach lists of frequently used commands to buttons, and then execute them with the click of a mouse.

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discs. In fact, just the opposite has happened. With erasable technology now on the frontier, WORM has become a safer bet in the minds of users, causing a spurt in the number of vendors producing WORM drives for the Mac.

WORM drives are guaranteed a place in the market because they are much better for archiving than erasable drives are. Current erasable drives all use magneto-optic technology, in which a laser heats the medium, changing its magnetic polarity. This technique gives the data an estimated life of ten years. WORM drives burn holes into the medium, giving data at least 100 years of life. In fact, WORM data can outlast modern paper, which, because of its acid content, begins to crumble after a few decades.

WORM-Drive Products



Of the three WORM drives looked at for this review, the LaserDrive 820 came out slightly ahead of the Panasonic LF-5010, with the Storage Dimensions LaserStor coming in a distant third.

WORM drives are generally slower than magneto-optical drives, but the LaserDrive 820 keeps up with erasable drives. The Panasonic LF-5010 was 12 percent slower, with the LaserStor more than twice as slow as that. LaserDrive claims to have the fastest WORM drive on the market.

But speed isn't the whole story. The LaserDrive 820 has the most Mac-like interface. You format blank discs with the same dialog box you use for blank floppies. You eject discs by dragging the icon to the trash. Utility software is necessary for mounting the disc on the desktop the first time you insert it, but the icon comes up by itself whenever you reinsert a disc after that.

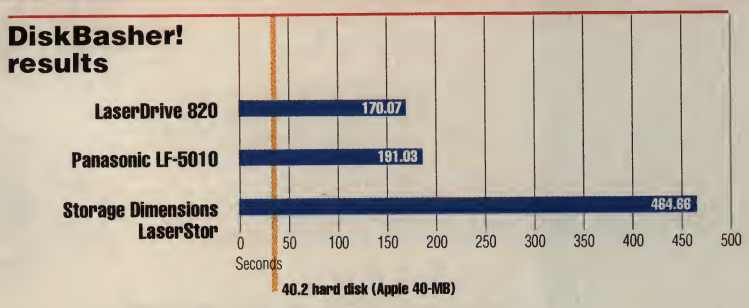
The Panasonic disc mounts when you push it in but does not eject when you trash the icon unless you first push the Eject button. The LaserStor disc mounts only if it is in the drive when you boot up the Mac. Otherwise, you need to run utility software every time you insert a disc. The disc does not eject when you throw away the icon.

Panasonic and Storage Dimensions use different drives, but both use similar software from Corel, which also sells its own line of WORM and erasable drives. Corel's software had the look and feel of a DOS port and was generally inferior to LaserStor's. (At press time, Storage Dimensions was replacing Corel's software with its own; the beta copy I saw was impressive.)

With all WORM drives, you can delete files in the Finder, but they remain invisibly there, which confuses both the Mac and PC operating systems about how much space is really available. To find out, you have to run the utility supplied with all three drives.

Both the LaserDrive and Panasonic units are good choices. The LaserDrive's only drawback is its size — it's nearly 16 inches tall. At press time, LaserDrive was planning to produce a smaller cabinet.

WORM-Drive Benchmarks



Who Needs It?

The thought of unlimited storage on gigabyte cartridges is enough to make desktop publishers and CAD users drool, but optical storage doesn't begin to look economically attractive until you require about 500 megabytes. A 650-megabyte hard disk can cost $8,000, whereas most erasable drives are currently in the $4,000-to-$6,000 range. WORM drives are less expensive than erasable drives, retailing at $2,000 to $4,000 each. Optical discs and drives are also less easily damaged when moved about than are fragile hard disks.

But don't throw away your hard-disk drive just yet. Although WORM and erasable drives are faster than CD-ROM drives, professionals currently find all optical drives too slow for running the Mac operating system. In fact, at the time of this writing, neither the Sony nor Ricoh erasable drive could be used as a startup device when a hard disk was also attached to the Mac.

There are applications for which optical media are the best choice, though. For example, WORM drives are increasingly replacing tape for mastering CD-ROM because WORM drives provide random access. Also, engineers can put erasable drives to good use for data-acquisition tasks. Parallel Geosciences of Austin, Texas, includes an erasable optical drive with its RISC-enhanced, Macintosh-based system, which collects and analyzes geophysical data for the oil industry. In this data-acquisition process, a single data set can occupy several hundred megabytes.

Vertical applications such as these may be interesting, but the biggest growth potential for optical-disc technology lies beyond the desktop.

PHOTOGRAPHY: PETER ALAN GOULD

Although all optical-disc technology is used in desktop publishing, erasable and WORM drives combined with scanners, networks, and file servers have the potential for going far beyond desktop publishing. At an industry conference last winter, Larry Miller of Caere (producer of OmniPage optical–character-reader software) predicted that 60 percent of scanners will be used for tasks other than desktop publishing. He was talking about document processing and on-line archiving, which are made possible only by writable optical discs.

Processing Documents

Information technology in business has witnessed a progression in the past three decades from centralized data processors in the '60s and

WORM Guide

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Price: $5,845.

Corel Systems 400M
Comments: NetWare options.
Manufactured by: Corel Systems Corp., 1600 Carling Ave., Ottawa, Ontario K1Z 8R7, Canada; (613) 728-8200.
Price: $2,895.

Corel Systems 650M
Comments: NetWare options.
Manufactured by: Corel Systems Corp., 1600 Carling Ave., Ottawa, Ontario K1Z 8R7, Canada; (613) 728-8200.
Price: $3,975.

Corel Systems 800M
Manufactured by: Corel Systems Corp., 1600 Carling Ave., Ottawa, Ontario K1Z 8R7, Canada; (613) 728-8200.
Price: $3,655.

Corel Systems 940M
Manufactured by: Corel Systems Corp., 1600 Carling Ave., Ottawa, Ontario K1Z 8R7, Canada; (613) 728-8200.
Price: $3,845.

LaserDrive 820
Manufactured by: LaserDrive, 1101 Space Park Drive, Santa Clara, CA 95054; (408) 970-3600.
Price: $5,995.

Mitsubishi MW-5U1-U11
Manufactured by: Mitsubishi, 991 Knox St., Torrance, CA 90502; (213) 515-3993.
Price: $3,800; MW-SWKA-MAC software, $595.

Panasonic LF-5010
Manufactured by: Panasonic, 2 Panasonic Way, Secaucus, NJ 07094; (201) 348-5230 or (201) 348-7000.
Price: $3,299; interface kit for Mac, $299.

Pioneer DD-S5001
Comments: Single or double drive.
Manufactured by: Pioneer, Sherbrook Office Center, 600 E. Crescent Ave., Upper Saddle River, NJ 07458-1827; (800) 527-3766 or (201) 327-6400.
Price: Single, $3,100; double, $2,100 extra.

Storage Dimensions LaserStor for Mac
Manufactured by: Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; (408) 879-0300.
Price: $4,999.

Toshiba WM-S070
Comments: ISO-compatible at 600 megabytes or nonstandard at 900 megabytes.
Manufactured by: Toshiba Disk Product Division, 9740 Irvine Blvd., Irvine, CA 92718; (800) 456-3475.
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Freehand ..... 348.
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ALSoft
DiskExpress 1.5 ..... 45.
Master Juggler ..... 59.
MultiDisk ..... 41.

Altsys
FONTastic Plus ..... 51.
Fontographer ..... 228.

Ashton-Tate
dBASE Mac ..... 294.
Full Impact ..... 248.
FullWrite Professional ..... 264.

Bedford
Simply Accounting ..... 178.

Berkeley System Design
Stepping Out 2.01 ..... 51.

Blyth Software
Omnis 5 Single User ..... 379.

Bootware Software
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ResuméWriter - Student ..... 18.

Borland International
Reflex Plus ..... 188.
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QuickDEX ..... 31.

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CalendarMaker 3.0 ..... 31.
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Cricket Color Paint ..... 169.
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Dantz Development
Retrospect ..... 154.

DataViz
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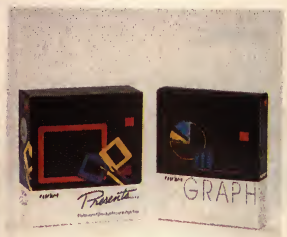
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TeleBridge ..... 348.

TOPS
TOPS FlashBox ..... 123.
TOPS Repeater ..... 128.
TOPS TeleConnector DB-9 or DIN-8 ..... 29.

MONITORS & BOARDS

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MultiSync 20" Color Mon. ..... 2895.

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Crystal View SE ..... 1395.
Crystal View SE/30 ..... 1395.

MISCELLANEOUS

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Quickstep Page Printer .... 3295.

Dayna Communications
DaynaFile - Single Drive
DF0100 (360k) ..... 525.
DF0200 (1.2Mb) ..... 605.
DF0300 (720k) ..... 605.
DF0400 (1.44Mb) ..... 685.
DaynaFile - Dual Drive
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DF0204 (1.2Mb/1.44Mb) ... 898.

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Extalite L-5 ..... 449.

PLI (Peripheral Land, Inc.)
TurboFloppy 1.4 ..... 325.

Entertainment

Access Software
World Class Leader Board ... 27.

Accolade
4th & Inches ..... 27.
Hardball ..... 27.
Mean 18 ..... 27.

Activision
Cosmic Osmo ..... 45.
Manhole ..... 30.
Manhole CD Version ..... 35.

Brøderbund
Ancient Art Of War ..... 26.
Ancient Art Of War at Sea .... 26.
Shufflepuck Cafe ..... 23.
SimCity 1.1 ..... 27.
Where In The U.S.A. Is Carmen Sandiego? ..... 27.
Where In The World Is Carmen Sandiego? ..... 29.

Bullseye Software
Ferrari Grand Prix ..... 31.
P-51 Mustang Flight Sim. .... 31.

Casady & Greene
Crystal Quest 2.2 ..... 25.
Crystal Quest 2.2 with Critter Editor ..... 41.

Centron
Casino Master B & W ..... 44.
Casino Master Color ..... 49.

Data East
Super HangOn ..... 26.

Discovery Software
Arkanoid ..... 26.

Electronic Arts
Bard's Tale ..... 32.
Chuck Yeager's Advanced Flight Trainer ..... 31.
Panzer Battles ..... 28.
Patton Vs Rommel ..... 14.

Epyx
Sub Battle ..... 29.

Mediagenic
Might And Magic ..... 35.
Might And Magic II ..... 38.
Quarterstaff ..... 29.
Shanghai ..... 19.
Universal Military Sim. ..... 29.

MicroProse
Pirates! ..... 32.

Microsoft
Flight Simulator 1.02 ..... 32.

Miles Computing
Fool's Errand ..... 31.
Harrier Strike Mission II ..... 31.
Puzzle Gallery ..... 26.

Mindscape
Aussie Joker Poker • Balance of Power 1990 • Colony • Crossword Magic • Deja Vu • Deja Vu II • Gauntlet • Shadowgate • Trust & Betrayal • Uninvited ..... each 29.

Origin Systems
Autoduel or Moebius ..... 23.

PBI Software
NetTrek ..... 34.
Strategic Conquest 2.0 ..... 34.

Shodan
Leprechaun ..... 36.



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Dark Castle ..... 31.

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Software Toolworks
Chessmaster 2100 ..... 31.
Cribbage King/Gin King ..... 38.
Hunt For Red October ..... 31.
Life & Death ..... 31.

Sphere
Falcon 2.0 ..... 31.
Gato 1.4 ..... 26.
PT 109 ..... 26.
Solitaire Royale ..... 19.
Tetris (Black & White) ..... 19.
Tetris (Color) ..... 22.

Spinnaker
Sargon IV ..... 28.

Strategic Simulations
AD&D: Pool Of Radiance ..... 32.

Three Sixty
Warlock ..... 28.

XOR Corporation
Lunar Rescue ..... 33.
Mac Racquetball ..... 36.
MacGolf Classic ..... 52.
MacGolf ..... 34.
MacCourses ..... 20.
NFL Challenge ..... 54.
Pro Challenge ..... 28.
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Education

Bible Research Systems
The Word (KJV, NIV, NKJV, RSV) ..... 164.

Borland International
Eureka: The Solver ..... 127.

Bright Star Technology
Alphabet Blocks ..... 30.
Talking Tiles ..... 29.

Brøderbund
Calculus, Geometry, or Physics ..... each 58.
Type! ..... 19.

Davidson & Associates
Math Blaster ..... 26.

Great Wave Software
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Reader Rabbit 2.1 ..... 31.

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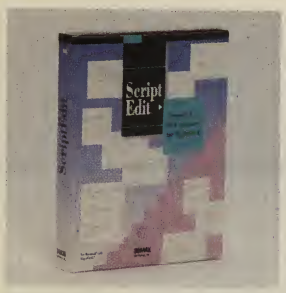
Simon & Schuster
Typing Tutor IV ..... 34.

Software Toolworks
Mavis Beacon Teaches Typing ... 32.

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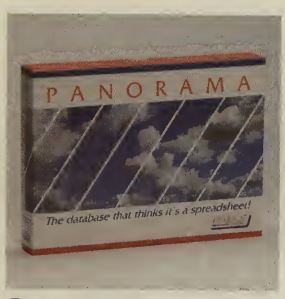
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Practica Musica 2.19 ..... 72.
Bogas Productions
Super Studio Session ..... 65.
Studio Session 1.4 ..... 46.
Brass • Country • Heavy Metal • Sound FX • String Quartet ..... each 13.
Brøderbund
Jam Session ..... 28.
Coda
Finale 1.2.6 ..... 399.
Mac Drums ..... 31.
Perceive ..... 49.
Electronic Arts
Dlx Music Const. Set ..... 84.
Deluxe Recorder ..... 99.
Farallon
MacRecorder 2.0 ..... 164.
Great Wave Software
ConcertWare Plus ..... 38.
ConcertWare Plus MIDI ..... 78.
Mark Of The Unicorn
Professional Composer ..... 389.
Professional Performer ..... 395.
Passport Designs
Click Tracks ..... 309.
MasterTracks Jr. ..... 89.
MasterTracks Pro 3.3 ..... 258.
MIDI Interface ..... 89.
MIDI Transport ..... 309.
Note Writer II ..... 325.
Primera Software
Different Drummer ..... 58.
Resonate
Listen 2.1 ..... 62.

Accessories

Abaton
Pro Point ADB (SE & II) ..... 79.
Addison Wesley
Inside Macintosh
Vol. 1, 2, 3, 4 ..... 21.
Vol. 5 ..... 23.
Inside Macintosh, X-Ref ..... 15.
Mac Prog. Secrets ..... 19.
Advanced Gravis
MouseStick ..... 69.
MouseStick (ADB) ..... 84.
American Power Conversion
UPS 110SE ..... 325.
Apple - LW Toner Cartridges
LaserWriter II Series ..... 115.
LaserWriter & LW Plus ..... 115.
Asher Engineering
Turbo Trackball ADB ..... 62.
Bantam Books
Mastering Wingz ..... 21.
The Complete HyperCard Handbook (2nd Ed.) ..... 22.
DataDesk
Mac 101 Keyboard ..... 144.
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Ergotron
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Double Sided - Bulk 1.19
High Density - 10 Pack ..... 28.
Fujitsu
800k Disk Drive ..... 155.
Golden Ribbons
IW II - Multi Colored ..... 7.
ImageWriter II - Black ..... 3.
Goldstein & Blair
Macintosh Bible ..... 19.
Kalmar Designs - Disk File
Holds 45 Disks ..... 14.
Holds 90 Disks ..... 21.
Holds 135 Disks ..... 31.
Kensington Microware
Mac II Stand With Extension Cables ..... 64.
System Saver Mac Fan ..... 64.
Turbo Mouse ..... 109.
Kraft
QuickStick ADB ..... 49.
QuickStick (512k & Plus) ..... 39.
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Mac SE Bag XT (for Extended Keyboard) ..... 69.
MacTech
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Mouse Pad ..... 6.
SCSI Tester ..... 69.
Mac Tool Kit ..... 15.
Zone Cable DB-9 or DIN-8 TeleConnector ..... 17.
Maxell
150meg Backup Tapes ..... 32.
60 Meg Backup Tape ..... 22.
Microsoft Press
Excel In Business ..... 20.
Mobius
Fanny Mac (Platinum) ..... 59.
MSC Technologies
A+ Mouse (512k & Plus) ..... 65.
A+ Mouse ADB ..... 79.
Orange Micro
Grappler C/Mac/GS ..... 78.
Grappler Mac LQ ..... 102.
Grappler Mac LS ..... 102.
Grappler Spooler ..... 38.
Sony Disks
DC 2000 40 Meg. Tape ..... 23.
Double Sided - 10 Pack ..... 14.
Double Sided - Bulk 1.29
High Density - 10 Pack ..... 29.
High Density - Bulk 3.25
Summagraphics
Bit Pad Plus (ADB) ..... 324.
Targus
Deluxe Mac/SE Extended Bag
Black, Gray, Navy, or Wine ..... 72.
ImageWriter Bag Black ..... 48.
Mac/SE Bag Black ..... 56.
Williams & Macias
Labels, 216 (ImageWriter) .. 15.
Labels, 216 (LaserWriter) .... 18.
myDiskLabeler (ImageWriter) .... 28.
myDiskLabeler (LaserWriter) .... 33.
Sticky Business ..... 95.

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Erasable Guide

Units with Sony Engine

Dolphin Systems Sonar-600
Manufactured by: Dolphin Systems Technology, 1701 E. Edinger Ave., Building G, Santa Ana, CA 92705; (714) 558-3220.
Price: $5,995.

Peripheral Land Infinity Optical
Comments: Includes TurboBack backup software, TurboSpool print spooler, TurboCache accelerator, TurboOptimizer disk, and defragmenter.
Manufactured by: Peripheral Land, Inc., 47421 Bayside Parkway, Fremont, CA 94538; (415) 657-2211.
Price: $5,695.

Peripheral Land Infinity Optical 1.2
Comments: Double drive; includes TurboBack backup software, TurboSpool print spooler, TurboCache accelerator, TurboOptimizer disk, and defragmenter.
Manufactured by: Peripheral Land, Inc., 47800 Westinghouse Drive, Fremont, CA 94539; (415) 657-2211.
Price: $11,995.

Pinnacle REO-650
Manufactured by: Pinnacle Micro, Inc., 15265 Alton Parkway, Irvine, CA 92718; (800) 553-7070 or (714) 727-3300.
Price: $4,995; driver software, $495.

Pinnacle REO-1300
Comments: Dual-drive unit.
Manufactured by: Pinnacle Micro, Inc., 15265 Alton Parkway, Irvine, CA 92718; (800) 553-7070 or (714) 727-3300.
Price: $9,990.

Pinnacle REO-16000
Comments: Includes 16-gigabyte jukebox, 25 discs, and 3 drives.
Manufactured by: Pinnacle Micro, Inc., 15265 Alton Parkway, Irvine, CA 92718; (800) 553-7070 or (714) 727-3300.
Price: $69,995.

Summus LightDisk 650
Manufactured by: Summus Computer Systems, 17171 Park Row, Suite 300, Houston, TX 77084; (713) 492-6611.
Price: $5,495.

Units with Ricoh Engine

FWB HammerDisk600
Manufactured by: FWB, 2040 Polk St., Suite 215, San Francisco, CA 94109; (415) 474-8055.
Price: $4,995.

Jasmine Direct Optical
Manufactured by: Jasmine, 1740 Army St., San Francisco, CA 94124; (800) 347-3228 or (415) 282-1111.
Price: $4,995.

LaCie Cirrus 600
Manufactured by: LaCie, 16285 S.W. 85th Ave., Suite 306, Tigard, OR 97224; (503) 684-0143.
Price: $4,995 (includes Mac Plus or $1,200 worth of Apple products from Businessland [for limited time]).

MACsetra Genesis 6000
Manufactured by: MACsetra, 2414 Koyl Ave., Saskatoon, Saskatchewan S7L 7L5, Canada; (306) 934-6044.
Price: $4,995.

RACET COSMOS 600
Comments: Includes Silver Lining backup, password protection, and utilities and Silver Server disk-sharing software.
Manufactured by: RACET computes, Ltd., 3150 E. Birch St., Brea, CA 92621; (714) 579-1725.
Price: $5,449.

Relax Erasable Optical Plus
Manufactured by: Relax, 3101 Whipple Road, #22, Union City, CA 94587; (415) 471-6112.
Price: $4,995.

Sumo Systems RSSM600-B
Manufactured by: Sumo Systems, 1580 Old Oakland Road, Suite C103, San Jose, CA 95131; (408) 453-5744.
Price: $4,500.

XYXIS XY600RW
Comments: Includes disk-partition software.
Manufactured by: XYXIS Corp., 7084 Shady Oak Road, Eden Prairie, MN 55344; (612) 944-8288.
Price: $4,995.

Unit with Maxtor Engine

Storage Dimensions MacinStor
Manufactured by: Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; (408) 879-0300.
Price: $7,995.

Integrated System

Micro Dynamics MARS
Manufactured by: Micro Dynamics, 8555 16th St., Silver Spring, MD 20910; (301) 589-6300.
Price: Starts at $16,000.

Erasable-Drive Products



PHOTOGRAPHY: PETER ALAN GOULD

Of the three magneto-optical drives I looked at, the Pinnacle REO-650 edged out the Relax Erasable Optical Plus and the Jasmine Direct Optical. The Pinnacle REO-650 uses a Sony engine; the other two drives use a Ricoh.

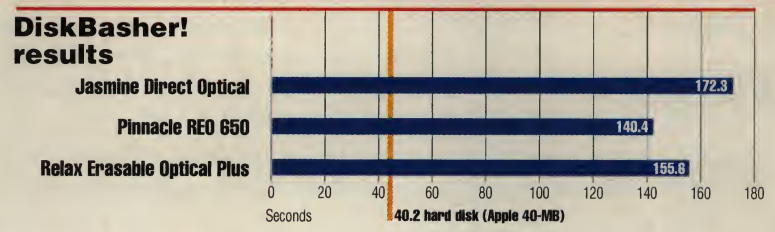
The Pinnacle drive was faster than the other two and had the most-trouble-free software. The disk interface behaved like that of a floppy-disk drive — except for formatting. With some drives (such as MACsetra's Genesis 6000), if you insert a blank disc, the Finder asks you to initialize it. The Pinnacle REO-650 also lets you do this, but the disc is not formatted properly — you're required to use its own formatting utility.

The Relax drive, designed to fit under an SE, has the best casing. Like all Relax storage devices, it comes with three AC outlets into which you can plug the Mac and peripheral devices. Each outlet has a front-panel on/off switch, and surge and spike protection is built into the unit.

Unfortunately, the Relax optical software I was using didn't have all the bugs worked out of it, and I received several bug fixes for the formatting utility while reviewing the software. The Relax driver wouldn't work with an external hard drive from Priam; none of the other drives I looked at had that problem. Neither Priam nor Relax could explain it.

The Jasmine Direct Optical drive was disappointing, coming from a manufacturer of fine hard-disk drives. Besides being slower than the other two, it had a clunky interface. The disc doesn't come up in the Finder unless it is inserted before you boot up, and you must use a utility to mount the disc on the desktop each time you insert a disc.

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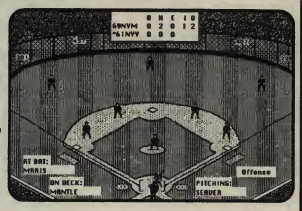
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isolated word processors in the '70s toward distributed networked document processing in the '80s. Whereas word processing deals mostly with printed text and, of late, some graphics, document processing handles both of these plus handwritten text. Typed or handwritten documents with signatures can be scanned into networks as bit-mapped images and stored on optical discs, saving time in both input and output — no data entry and no looking through shoe boxes to find a document.

On-line archiving is simply the ability to keep large amounts of information on-line. Instead of scrolling through sheets of microfiche or searching through a roomful of filing cabinets, users are able to type the name of a document or a keyword to retrieve information. Users of such on-line archiving systems — such as legal departments, medical libraries, pharmaceutical companies, and the American Institute of Physics — have found them to greatly increase research productivity.

MARS can access millions of files, not just the thousands that generic database managers can.

The systems we see today use Macs and PCs as graphics workstations, often connected to bigger computers acting as centralized file servers. Optical discs can be stored in jukeboxes, which have the capacity to hold several dozen discs. American Express is one of the large companies that has installed such a system to process the millions of documents coming through its offices.

MARS, Bringer of Integration

To build a document-processing system, you can assemble the optical drives, workstations, jukeboxes, network hardware, and software yourself or buy an integrated turnkey system from a specialized vendor. Two popular systems are FileNET, based on PCs, and Wang, based on Wang hardware. IBM and DEC are planning systems that use their own minicomputers as file servers.

The Macintosh, being the archetypal intelligent graphics workstation, will most likely fit into DEC's Compound Document Architecture system. We have already seen some of the fruits of the agreements between DEC and Apple Computer during the past year, such as Macintosh support for transmission control protocol/Internet protocol (TCP/IP),

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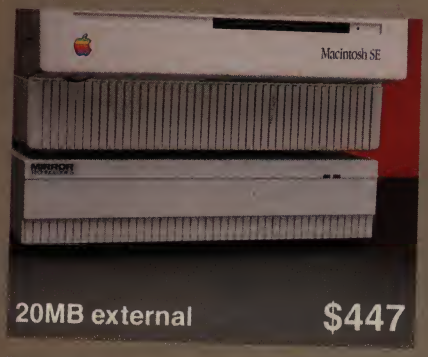
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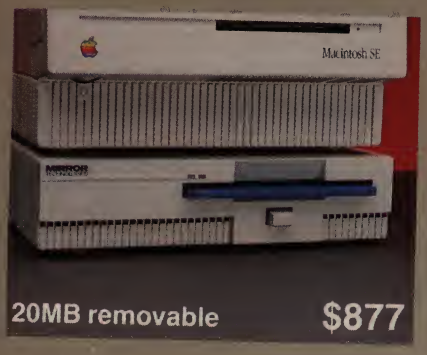
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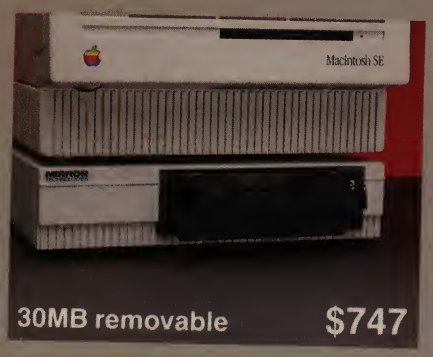
The RM20 operates as fast as many hard drives but with the integrity of a floppy. Utilizing disks and technology from Kodak, the shock resistant media is guaranteed for life, making it perfect for archiving and backups.
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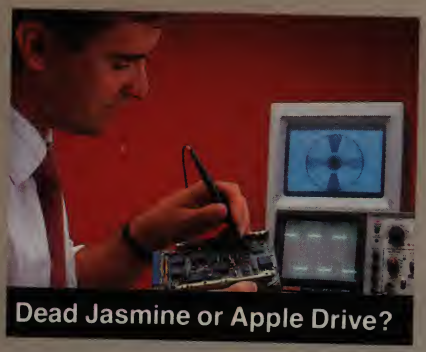
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X Window, and six new application-programmer interfaces (APIs).

But if you need a turnkey system now and don't need a mini yet, you can get MARS, a Mac-based document-processing system from Micro Dynamics. Short for Multiuser Archival and Retrieval System, MARS uses WORM or erasable optical discs alone or in jukeboxes to store data from a variety of input devices — scanners, slide recorders, and even devices that scan in microfilm and X-rays. MARS can include the Calera Recognition Server to turn pictures of text into ASCII characters. Micro Dynamics sells and sets up these devices and provides the Macs, training, and support.

The heart of MARS is its specialized database, which can access millions of files, not just the thousands boasted by generic database managers. You do need to dedicate a Mac

On the Horizon

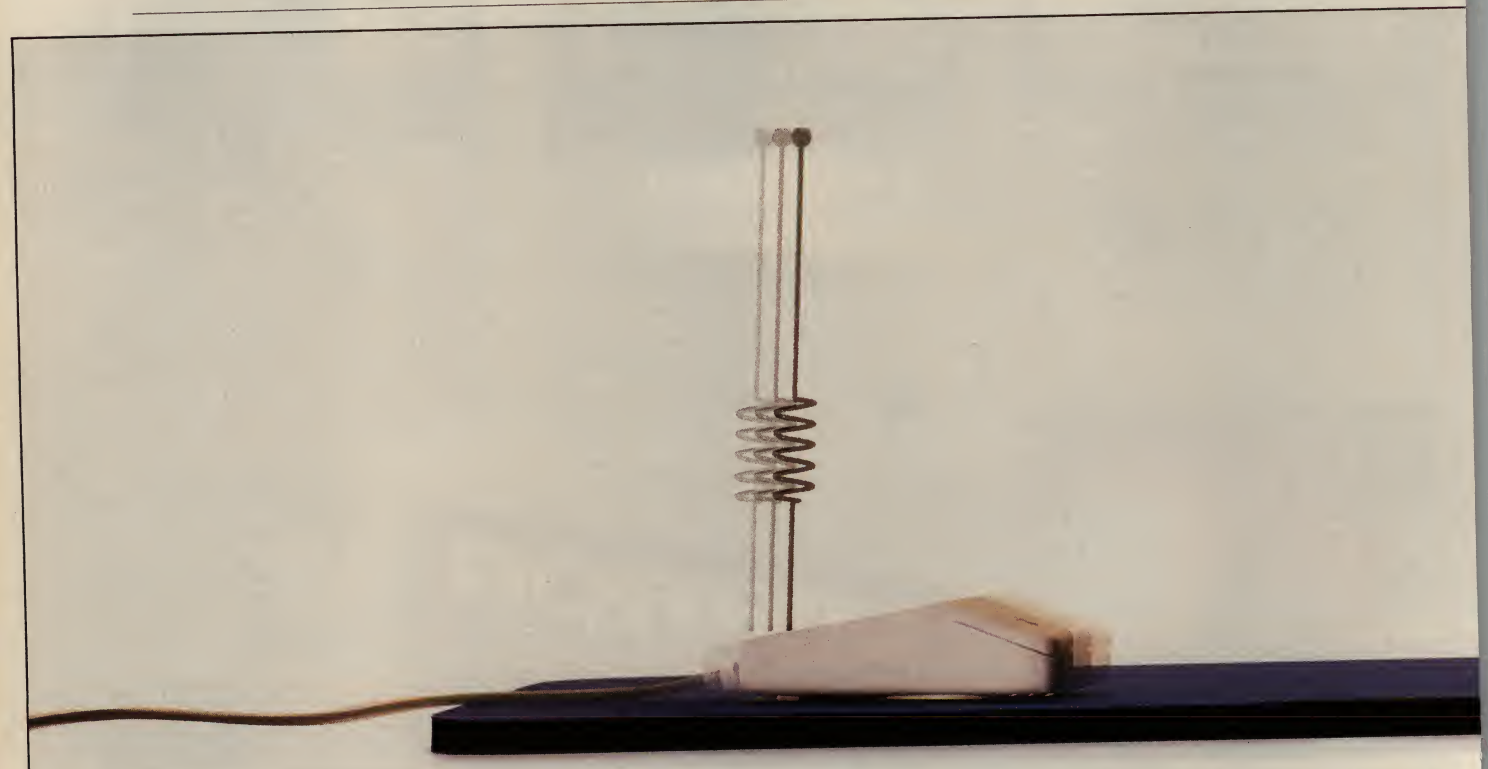
Many manufacturers of erasable optical drives are moving to provide products based on both Sony and Ricoh OEM engines, but users will soon have a third choice: Storage Dimensions' MacinStor unit uses a Maxtor Tahiti I engine. Interestingly enough, Storage Dimensions claims the new drive will perform as well as a magnetic hard-disk drive. The company also plans to charge almost as much as for a hard-disk drive ($7,995, including a 1-gigabyte disc). A beta unit I tested yielded a DiskBasher! time of 104.13 seconds, still more than twice as slow as a hard-disk drive but faster than the other erasable optical drives I tested. Shipping was planned for September.

LaserDrive is planning to release a 3.5-inch magneto-optical erasable drive sometime next year. The cartridge will hold less than half the data that today's 5.25-inch cartridges do.

Further on down the line are alternatives to magneto-optical erasable discs. Several OEMs are at work developing dye-polymer and phase-change erasable discs. These methods promise to produce less expensive discs than the current magneto-optical units, but there will be a limit to the number of times you can write to them. It should be at least a year before such products appear on the market.

You can look for some OEMs to announce double-sided erasable and WORM drives by the end of the year. A double-sided drive would make both sides of the disc available to the computer at the same time. Retail vendors have not yet announced double-sided products, however.





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solely for the database, however. I was impressed by how quickly the database manager searched for every occurrence of the word *the* in a large database, taking only a few seconds.

Optical-Disc Trends and Turns

Because of their speed and price, writable optical discs will create a new storage category — that of direct-access secondary storage — but they will not replace hard disks. Hard disks should be used for System files and often-used applications. Most optical-disc drives will be attached to networks. Some CD-ROM drives may be used in networks, but they can also be used instead of networks, because they represent a less expensive data-distribution method than networks over a wide area. The superior data integrity and durability of WORM discs guarantee them a place beside erasable drives in the market.

Optical discs will create a new storage category but won't replace hard disks.

Is it time to invest in optical storage now? As far as CD-ROMs go, if you can find published discs that you can use, go ahead. The technology is solid, standards are in place, and the price is stable. But it is still not certain whether enough titles will come out to sell drives or whether enough drives will be sold to spur publishers on.

WORM drives are also solid technologically and have stable prices. They don't have the portability of CD-ROM drives, but portability is less important for random-access, online archiving.

Erasable optical-disc technology is still new, and many people will find that Mac driver software still needs to have some minor bugs worked out. Because of increasing competition, the per-megabyte cost of erasable media should decrease next year, making it more competitive with high-capacity magnetic media. Industry experts expect the price of erasable drives to stabilize to the WORM range ($2,000 to $4,000) within the next five years, with disc capacities increasing. Most people can probably afford to wait for prices to come down, but some organizations can use optical drives right now. For them, a drive will pay for itself in enhanced productivity.

John Rizzo is the technical editor of *MacUser*. He will miss having 6.5 gigabytes of optical storage on his desk when he returns the drives he tested for this piece.

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Graphics on the Slide

MacUser Labs focuses its viewfinder on seven film recorders that help make your presentations more presentable.

By Gregory Wasson, Jeff Pittelkau, and Aileen Abernathy

The Macintosh has starred in films before, from *Star Trek IV* to weekly cameos on "Moonlighting." But now it's churning out the celluloid itself with the help of a peripheral device called a film recorder, which lets you turn graphics files directly into 35mm slides. Although it's often called a slide maker, *film recorder* is a more accurate term because you're not restricted to mounted slides for output. Color prints, overhead transparencies, and even posters are all possibilities — the output is limited only by what your local drugstore or a professional photographic lab can develop and print.

With the Mac firmly ensconced in the business world, the film recorder seems likely to become the next must-have peripheral. Corporate America has a love affair with slides, which are deemed an essential element of any important (or not-so-important) presentation. Accordingly, businesses will shell out well over $9 *billion* this year for around 830 million slides. That's a lot of pie charts.

Although desktop film recorders cost several thousand dollars, they pay for themselves quickly if you make lots of slides. Say you've created 30 images in-house that you need converted to slides. Having the slides produced at a service bureau such as Genigraphics or Autographix will cost at least $12 per slide, for a total of $360. But if you shoot the slides yourself with a film recorder, you pay only for developing and mounting. Even if the work is done by a professional color lab, the savings can be substantial; at 75 cents apiece, the 30 slides will cost only $22.50 — a price cut of 94 percent!

The savings become even more astronomical when you tack on service-bureau charges for rush orders, taxes, and shipping costs. And if you want the service bureau to design the slides in addition to shooting them, the cost per slide skyrockets to $50 or more. Multiply that by the number of slides you need each year, and you may find that buying a film recorder and training someone to use it is an economical alternative.

Film recorders also give you more control over the slide-making process, because you make the slides yourself,



PHOTOGRAPHY: FRED STIMSON

MacUSER LABS

right at your desk. It's easier to make last-minute changes, so you can work closer to deadline. The slide quality can't match what you get from a $70,000 Genigraphics film recorder, but for most boardroom slide shows, it's more than adequate and much easier on the pocketbook.

Reality Check

Some aficionados claim film recorders will do for presentations what laser printers have done for desktop publishing. Is all this hoopla just good PR, or are these peripherals worthy of your attention? If you don't have the time or staff to create the images in-house, or if you need only a few slides per month, then a service bureau is your best bet, despite its high cost. But if you are producing hundreds — or even dozens — of slides per month, a film recorder can be a prudent investment.

That being the case, which one should you buy? To find out, MacUser Labs rigorously tested seven digital film recorders: the ProColor ($6,495) and SlideWriter ($11,795), both from AGFA Matrix; the Still Light ($3,995) from American Liquid Light; the Lasergraphics LFR ($9,750); the Mirus FilmPrinter ($5,895); the Bravo ($5,995), a joint effort of Polaroid and Mirus; and the Montage FR1 ($6,995) from Presentation Technologies.

The keys to slide quality are resolution and color; for the impatient user, speed is equally important. Accordingly, our test battery checked image sharpness and geometry, the quality of color and text, film exposure, and imaging times. Our test platform was a Mac IIcx with 5 megabytes of RAM and System 6.0.3. The test images were created with Canvas 2.0, PowerPoint, and Visual Business No. 5. Our judges were three recognized experts in film-recorder technology (see "Acknowledgments"), who evaluated slides identified only by numbered tags. All the ratings were based on comparisons with the same images that had been sent to Genigraphics and Chartmasters (an Autographix service bureau). The results surprised even us (see Figure 1) — overall image quality was much better than expected, although there were some definite wipeouts.

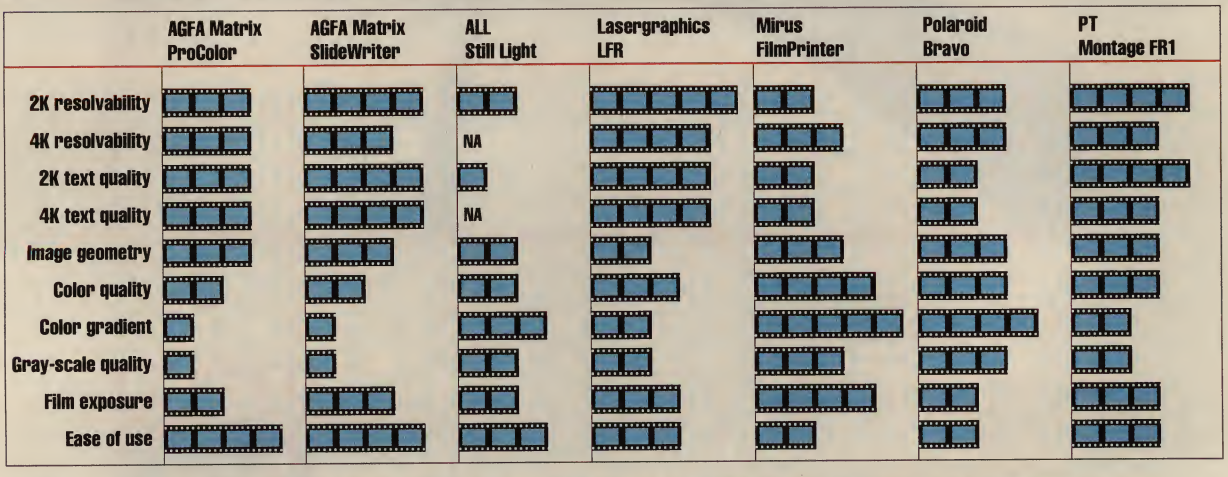
Setting Up Shop

A film recorder is basically a lightproof box containing a camera aimed at a tiny cathode-ray tube (CRT), which displays the image to be recorded on film (see "How It Works" sidebar). There are two basic types of recorders: analog and digital. Analog film recorders are very fast, and they work with almost any application, but they produce lower-quality slides because they use the signal from the Mac's video card to create the image (see "Analog Recorders" sidebar).

In contrast, a digital film recorder receives image information as a bit stream. It reconstructs the image, pixel by pixel, and displays it on its tiny CRT. This additional processing makes digital recorders slower than their analog counterparts, but it gives them higher resolutions — sharper images — and more flexibility in image size. In theory, there's no upper limit to the resolution of a digital film recorder. Because digital models provide superior images, they account for the bulk of film-recorder purchases and are the focus of this report.

Setting up a film recorder is easy: Plug in the SCSI cable, install the software, load the camera — and you're ready for action. Only the Still Light departs from this scenario; it works via a NuBus card, which must be installed in your Mac II. All the software packages require at least 2 megabytes of RAM, and some need a few megabytes of disk space as well. Each recorder comes with a 35mm camera, or *back* (American Liquid Light throws in a Polaroid back with its Still Light). If you have an extra $1,000 or so, other backs are available (see "Back It Up" sidebar). The most useful ones are Polaroid backs for making proof prints and bulk-loading backs that can handle more than 36 slides at a time (for overnight batch processing).

Figure 1: Test Results



Ratings: 1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent. A 5 is comparable to the highest quality available from a professional service bureau. A 3 indicates flaws in the image that were noticeable to the trained eye. A 1 means major problems with the product/test in question. Overall, the LFR is the clear winner in resolvability and text quality, while the FilmPrinter claims all the color honors. The AGFA recorders are the easiest to use, but their color quality is abysmal. The Still Light has no 4K mode.

Most of the recorders have status lights — power, imaging, problem — resembling those on a LaserWriter. The SlideWriter is the most informative, with an impressive array of lights that keeps you continuously aware of all operations. In contrast, the bare-bones Still Light has only a power light.

The LFR presented our only serious setup problem. The unit displayed an annoying propensity to blow a fuse because its 100-watt power consumption was too close to the limit of the 1-amp fuse. Lasergraphics is now using larger fuses, however, so this problem has largely disappeared. Some LFR units also emit a high-pitched whine, but the company denies that this is a chronic problem and willingly exchanges noisy units.

What about connectivity with the IBM world? It's available, for a price. Most recorders require hardware interfaces such as AGFA's MacHarmony ($1,995). The FilmPrinter, Bravo, and Still Light are IBM-incommunicado, but Mirus' new FilmPrinter Plus will offer a software interface for only $395 (see "On the Horizon" sidebar).

Resolved: More Pixels

Image resolution depends on three things: the number of pixels, their size, and the size of the CRT. Six of the film-recorders we tested offer both 2K and 4K resolution (the Still Light has only 2K). This number, called the *addressable resolution*, has nothing to do with memory or disk space but rather with the number of pixels (or *lines*, in industry jargon) on a single row of the recorder's CRT. In 4K mode, a recorder has about 4,000 pixels horizontally and 2,700 vertically; 2K resolution involves about 2,000 horizontal pixels.

The 2K mode is ideal for getting out slides in a hurry, although the images have some jaggies and color transitions aren't smooth (see Figure 2). A resolution of 4K is fine enough to eliminate the jaggies and give you sharp, smooth slides, but it takes longer to process because four times as many pixels are being imaged. The ProColor, for example, took four minutes to image a text slide at 2K but needed more than eight minutes at 4K. The difference in quality between 2K and 4K can be minor for some slides, with the focus of the slide projector having more effect on a slide's appearance. If you're making lots of slides on a tight deadline, the time difference may matter more than imaging resolution. (The Still Light, FilmPrinter, and Bravo offer 1K draft modes for even faster turnaround.)

Knowing the addressable resolution doesn't tell you how sharp the slides will look, however. The main determinant of image sharpness isn't the sheer number of pixels; rather, it's the relationship between CRT size and pixel size. If the pixels are too large, they must overlap if 4,000 (or even 2,000) of them are to be squeezed onto one line of the CRT. Some overlap is desirable because it smooths out the image, but too much produces a fuzzy focus.

The LFR and SlideWriter offer the ideal situation, resolutionwise, with small pixels (.04 and .05 millimeters) and a large CRT (6 and 7 inches). It's no surprise that they were the clear winners in image clarity and sharpness. Most of the other recorders have similar pixel sizes but smaller CRTs (typically around 3 inches). The two AGFA machines provide the best example of the importance of pixel size. These recorders have the same CRT size, but the ProColor's pixels are twice as large as those of the SlideWriter. As a result, the ProColor has a softer focus and fuzzy text, both of

Figure 2: The Resolution Question



A film recorder can produce slides up to three times faster at 2K resolution, but the image quality suffers. As a slide, the 2K mode may look just fine (right). But when it's projected on a screen, a 2K slide often displays jagged lines similar to the artist's rendering at left. This is because it has only one-fourth as many pixels as a 4K slide.

Analog Recorders

If you need to take color snapshots of your screen and don't care about high resolution, consider an analog film recorder. It's much faster than a digital model, doesn't require special software, and works with most applications. Although it's definitely not for desktop presentations, it can be just the ticket for medical imaging or for capturing video directly off the screen.

Analog film recorders, which work much like a camera, use a Y-shaped cable that connects in-line with your color monitor and video card. Position the image you want on-screen and push a button on the recorder, and it takes a high-quality color snapshot.

These units use the same CRT and filter-wheel technology as do digital film recorders, but they image at the resolution of your video card. On the Mac, this means 640 x 480 to 1,024 x 768 pixels, but not much more. As a result, text and line jaggies show up the same way they do on your color monitor. You're also limited to the color capabilities of the video card. If you have an 8-bit card, 256 colors is all you'll get on a slide. By contrast, digital film recorders are 24-bit, offering the full palette of 16.7 million colors.

A future Lab Report will cover analog film recorders in more detail. One unit we've examined is the Addtech Film Recorder, which records video images to ISO 100 film in less than 30 seconds. It ships with a cable for the standard Mac II video card, camera backs for 35mm and Polaroid 669/691 film, and the Polaroid PowerProcessor for developing 35mm instant slides. No software ships with the unit, because none is needed. The Film Recorder costs $5,295; cables for other video cards are $100 each. Contact Addtech Computer Systems, 601 Magnetic Drive, Unit 5, Downsview, Ontario M3J 3J2, Canada; (416) 736-7007.

— Jeff Pittelkau

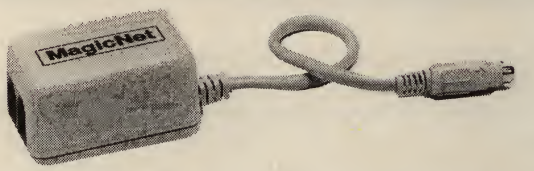
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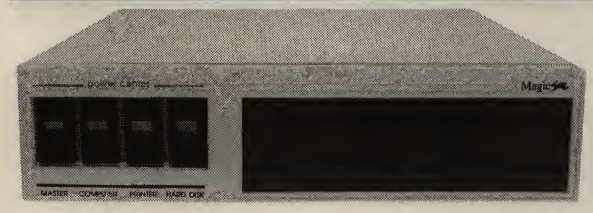


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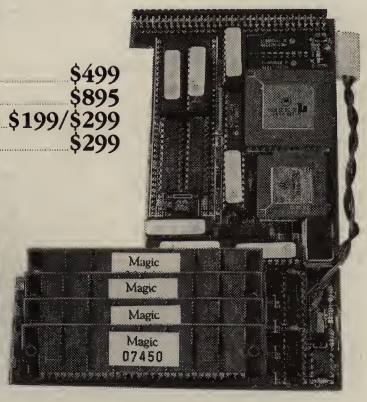
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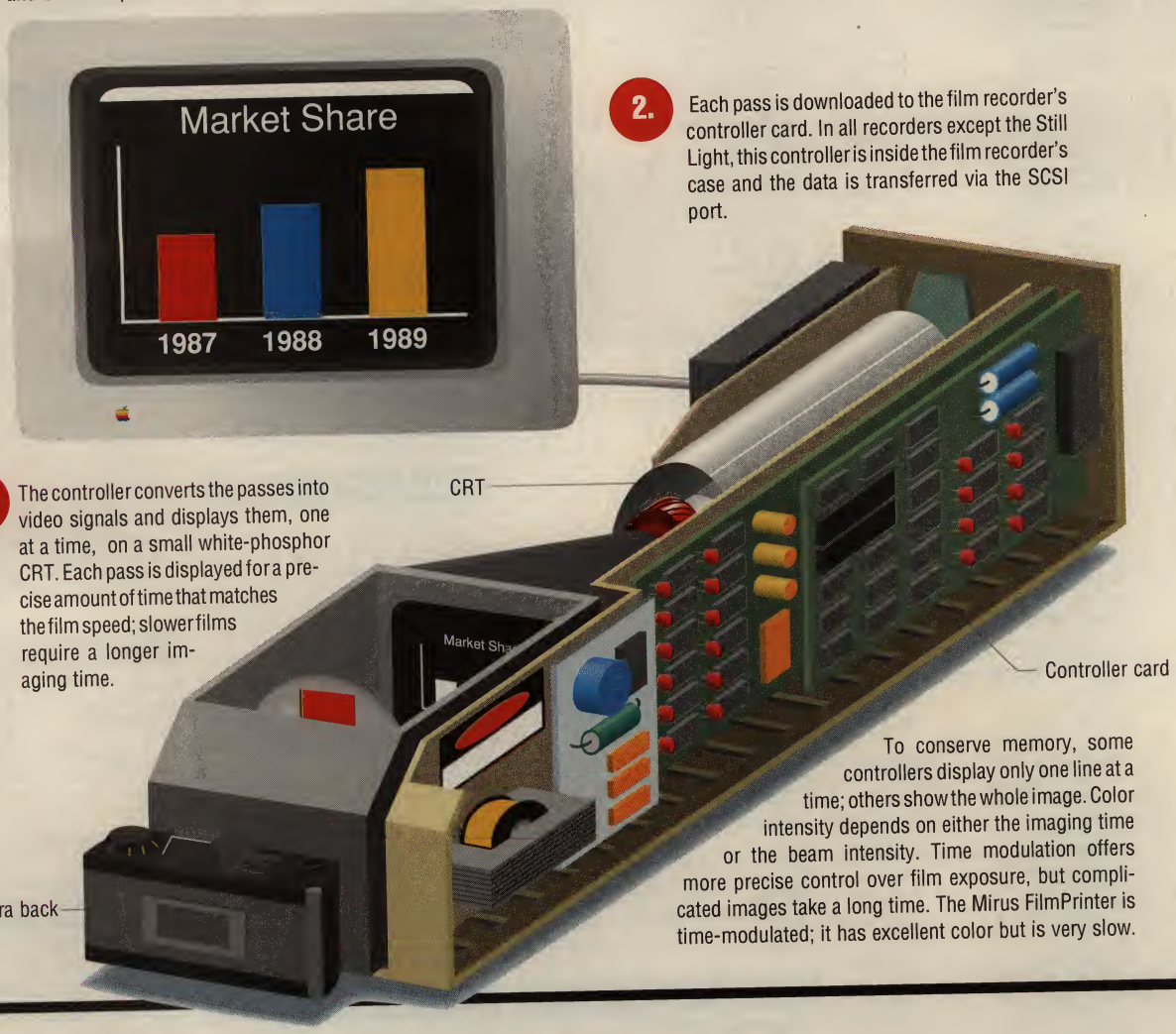
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How It Works: Digital Film Recorder

1. To create a slide, open the image file from within the recorder software — either a Chooser driver or an application — and tell it to print. The software analyzes the image, replacing screen fonts with high-resolution outline fonts and separating the entire image into red, green, and blue components. Each component, or *pass*, is then digitized as a high-resolution bit map.

2. Each pass is downloaded to the film recorder's controller card. In all recorders except the Still Light, this controller is inside the film recorder's case and the data is transferred via the SCSI port.



3. The controller converts the passes into video signals and displays them, one at a time, on a small white-phosphor CRT. Each pass is displayed for a precise amount of time that matches the film speed; slower films require a longer imaging time.

To conserve memory, some controllers display only one line at a time; others show the whole image. Color intensity depends on either the imaging time or the beam intensity. Time modulation offers more precise control over film exposure, but complicated images take a long time. The Mirus FilmPrinter is time-modulated; it has excellent color but is very slow.

which were perceptible during our tests.

Our test slide for 2K/4K resolvability contained a star-burst pattern, overlapping color blocks, and lines of various thicknesses (see Figure 3). The LFR and SlideWriter handled this test with ease, clearly outperforming the competition at both resolutions. These recorders are excellent choices for making slides that will be projected as images larger than 6 feet. The FilmPrinter, Bravo, and Still Light had the fuzziest images.

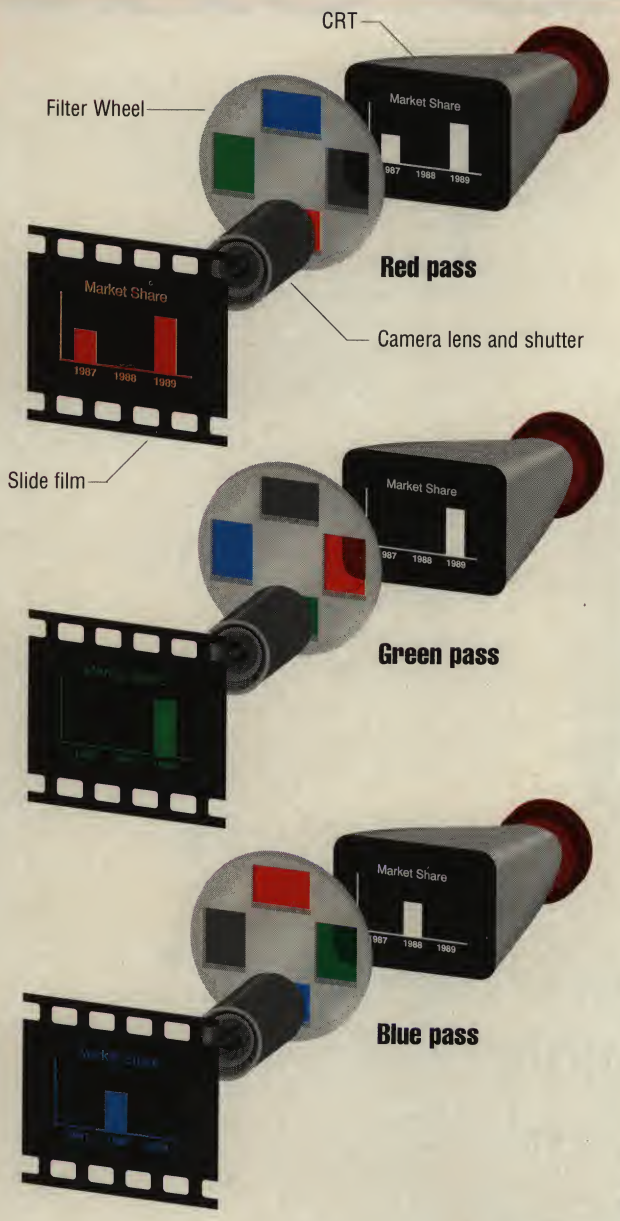
The LFR and the Montage were the only two film recorders to resolve thin lines correctly, making them ideal for power users who want to incorporate sophisticated graphics into their slides. The other recorders fatten up thin lines, making them too obvious. The FilmPrinter and Bravo not only fattened up the lines, but they also imaged them with noticeable jaggies.

We also tested geometric linearity, because a square image (figuratively speaking) is essential to slide quality. To check for geometric imperfections and distortion, we used a grid of squares enclosing circles. Only two recorders showed any irregularities: The Still Light's images bowed slightly inward at the sides, and the LFR displayed a slight waviness in horizontal lines.

True Colors

Next to resolution, color is the most important component of a good slide. Color quality depends on the film, the number of colors that can be imaged, and the recorder's internal color calibration. First and foremost is the type of film you use (see "In [Search of a] Decent Exposure" sidebar). Each recorder has a built-in color table fine-tuned for a particular kind of film. Some manufacturers prefer professional films; others recommend

Imaging



4. Just before each image is put onto the CRT, the controller activates a motor that rotates a color wheel containing red, green, and blue gel filters. The appropriate filter is moved in front of the CRT, intercepting the white light and "colorizing" it. This is the key to getting colors on film.

5. The camera shutter opens, exposing the film. The color passes are imaged one on top of the other to create the finished picture, which is, in effect, a triple exposure. Red light exposes the cyan layer of the film, green exposes magenta, and blue exposes yellow. The result is a negative image, similar to the negatives you get from print film.

6. You're not finished yet — all you have is a roll of film, and you still must get it processed. If you're using print film, the resulting negatives are used to make prints. For slide film, a special process turns the negative images into positive ones; the film is then cut and mounted into slides.

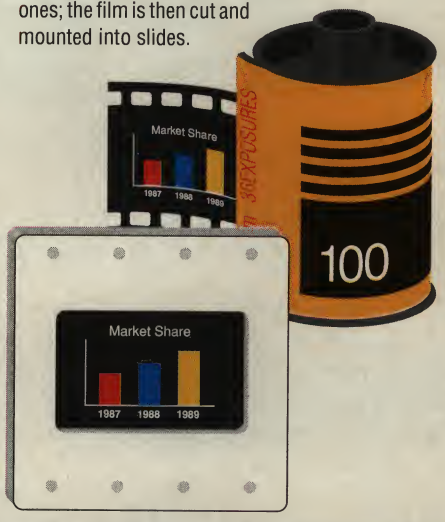


ILLUSTRATION: K. DANIEL CLARK

Ektachrome 100 HC, available at your local drugstore. You can use regular slide film instead of professional celluloid in any of the recorders, but the colors may be slightly off because the recorder hasn't been tweaked for that film type.

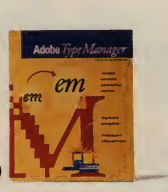
You can compensate for color miscues by using balance controls to alter the levels of red, green, and blue. Only the AGFA models lack RGB controls in software; the SlideWriter has none at all, and the ProColor has hardware tuners that must be adjusted with a screwdriver. You should also look for a recorder that offers contrast and brightness controls if you plan to experiment with other films. One of the first things we checked was film exposure. We used an image with blocks of gray in 10-percent increments to see whether slides were under- or overexposed at the recorder's default settings.

So how many colors can you put onto a slide, anyway? All the film recorders now support 24-bit color in both hardware and software, so the entire palette of 16.7 million colors is available, constrained only by the number of pixels. (At press time, the Still Light and LFR supported 8-bit color only in software, but upgraded versions were about to be released.) Manufacturers have also ensured the recorders' future compatibility with color applications by including support for 32-bit QuickDraw, Apple's new standard for color graphics.

Making 24-bit slides can be painfully slow, so most recorders offer a draft color mode, which speeds things up by using fewer bits per pixel. Colors won't be as accurate, but you get slides much faster. The Still Light, for example, has a 15-bit setting, which uses only 5 bits each for red, green, and blue, instead of the normal 8. The FilmPrinter and Bravo go even further; in their 3-bit mode, the

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Prior to 1984, most people thought of computers as excessively complicated, overly technical and, in most cases, far too intimidating.

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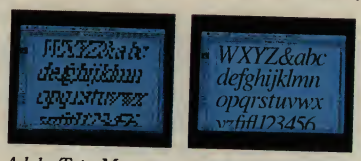
The introduction of the Macintosh was followed a year later by the arrival of the LaserWriter,® the first laser printer to rely on a completely new "page description language." The PostScript® language from Adobe Systems.

Suddenly, the desktop publishing revolution was born.

Simply stated, PostScript stores descriptions of font characters as smooth outlines comprised of mathematical formulas, rather than the more typical bitmaps. So, no matter how jagged the type might look on a Macintosh screen, it comes out crisp and clean on a PostScript-equipped laser printer.

To say this new technology changed the face of computing would be a monumental understatement. Yet, the initial excitement about desktop publishing has now given way to higher expectations from Macintosh users everywhere.

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When added to your system software (System 6.0 or later), it builds individual characters at any size from PostScript outline fonts—the same fonts used by PostScript printers.

Adobe Type Manager is actually based on the PostScript language's capability to create and scale fonts to different sizes. So it's very fast and very compact.

And, at just $99, it's very affordable. In fact, at that price, Adobe Type Manager probably offers more value than any other Macintosh software.

It's also very easy to install and operate.

You see, Adobe Type Manager is completely transparent to both you and your software applications.

So all you'll see is a better image.

Once it's installed in your System Folder, Adobe Type Manager intercepts QuickDraw™ font requests and generates the screen bitmaps (at the requested size) from a PostScript outline font. So, whether your text is regular, bold or italic, it looks smooth and readable from the largest point sizes to the smallest.

Then, when you print to your Apple ImageWriter or Hewlett-Packard DeskWriter, Adobe Type Manager automatically generates the requested printer font bitmap to produce beautiful, letter-quality text from any application.

That's because Adobe Type Manager is compatible with virtually all major Macintosh software—from programs for word processing and spreadsheets to page layout and presentations.

Which means it won't change the way you work.

Just the way you look.

And every Macintosh user can look better, because Adobe Type Manager requires just one megabyte of memory. That way, every Macintosh from a Plus to a IIcx can take advantage of its unique outline font technology.

Speaking of fonts, every copy of Adobe Type Manager includes high-quality outline versions of the 13 most popular fonts. They'll enable you to produce the kind of high-quality text from your ImageWriter or DeskWriter you thought only came out of a laser printer.

If you want to add more fonts, you can pick up the ATM™ Plus Pack, giving you the 22 additional outline fonts from Apple's LaserWriter IINT and IINTX laser printers. And, until December 31, 1989, ATM Plus Pack is priced at just $198.

Times*
Roman, *Italic*, **Bold** & ***Bold Italic***

Helvetica*
Regular, *Oblique*, **Bold** & ***Bold Oblique***

Courier
Medium, *Oblique*, **Bold** & ***Bold Oblique***

Symbol
ΑΒΧΔΕΦΓΗΙϑΚΛΜ ΝΟΠΘΡΣΤΥςΩΞΨΖ

Adobe Type Manager includes high-quality outline versions of these 13 most popular Macintosh fonts. You can also add any PostScript outline fonts, including those from the Adobe Type Library.

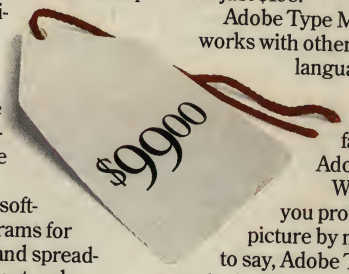
Adobe Type Manager also works with other Adobe PostScript language fonts, including the more than 500 typefaces from the Adobe® Type Library.

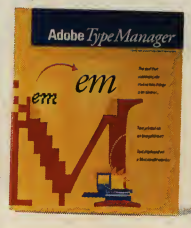
We could go on, but you probably have the picture by now. Suffice it to say, Adobe Type Manager is a lot better to look at than it is to read about.

Because, quite frankly, words don't do it justice.

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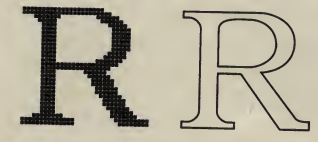
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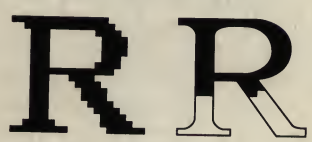


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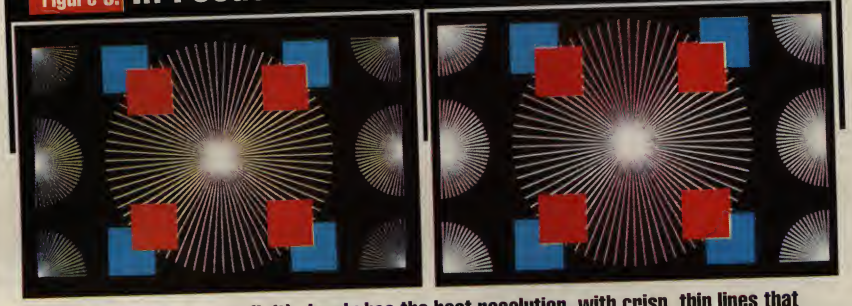
(Far Left) *Currently, the majority of personal computers, including Macintosh, store text characters as a pattern of dots (known as a bitmap).* (Middle Left) *But outline fonts—which were pioneered by Adobe—store the shapes of each character as easily-modified mathematical formulas.*



(Middle Right) *Scaling a bitmapped font is a less precise process, making the character less accurate and more difficult to read.* (Far Right) *When an outline font is used, the computer scales the outline to the precise size and shape, and fills it with dots. This results in a smoother, more accurate character.*

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Figure 3: In Focus



The Lasergraphics LFR (left) clearly has the best resolution, with crisp, thin lines that match those of our test images. The Mirus FilmPrinter, on the other hand, produces fat, jagged lines that are much thicker than in the original image.

color choices are limited to the eight basic QuickDraw colors.

We used three separate slides to evaluate color quality: a 256-level gray gradient, the standard 90-color palette from PowerPoint (which Genigraphics uses as its default palette), and a color gradient of 254 hues from red to yellow to green. All the recorders had acceptable color quality — red wasn't orange, and green was never yellow, although dark red was sometimes bright red.

Film type *can* make a difference, as demonstrated by the outputs of the FilmPrinter and Bravo. These are essentially the same machine (both are made by Mirus), but they use different films. The FilmPrinter uses standard professional film and passed every test with flying colors. It had the truest colors and a gradient so smooth that no transitions could be seen (see Figure 4). The Bravo, which uses high-contrast Presentation Chrome film, also had good color but wasn't in the same ballpark as its cousin.

Even the best-laid plans can go awry, however. Despite their use of professional film and 24-bit color, the ProColor and SlideWriter had the worst color quality of all the recorders. They displayed prominent banding on the color gradient, pastels were too saturated, and gray tones were tinged with color (see Figure 5). AGFA desperately needs to redo the color tables built into these units. The Still Light had problems as well; its colors didn't always match PowerPoint's default palette.

For a more objective assessment of color accuracy, we used a MacBeth Densitometer to measure the density of the film dyes at various gray levels, along with red, green, and blue at full saturation. The MacBeth results corroborated the findings of our other color tests.

Mind Your P's and Q's

Text usually plays a vital role in slides produced for corporate presentations, so the quality and variety of fonts is of considerable importance. Most recorders come with a basic complement of outline fonts, which provide smooth text at any size. And you can have whatever typeface you want, as long as it's Times, Helvetica, Courier, or Symbol. The Montage is the exception; its 43 fonts include outline versions of all the LaserWriter fonts plus Optima and Garamond. The LFR, FilmPrinter, and Bravo recorders offer similar font sets as pricey options, and AGFA will soon follow suit.

When an image is processed, the recorder's software replaces each screen font with the closest outline equivalent. Fonts that don't have matches (such as Chicago) remain as bit maps. The software for the LFR and Montage actually lets you control font substitution — you can specifically request the screen fonts or alternative outline fonts.

In (Search of a) Decent Exposure

Of all the elements in the image-recording chain, film is the strongest link. Because film has a greater resolution and contrast range than a film recorder, it has the most impact on your finished slides' appearance. Each manufacturer calibrates its film recorder to properly expose one or more of the popular slide films, such as Kodak Ektachrome. However, film that's out of date or that has been subjected to excessive heat produces off-color images.

Professional film is usually kept refrigerated while in storage. Some manufacturers (AGFA and Mirus, for example) recommend using professional film instead of the cheaper consumer-grade celluloid. Professional films also list the emulsion batch number, which enables photographers to purchase several rolls from the same batch to guarantee consistency. And, in the case of negative film, they can fine-tune printing in an enlarger by using the filter factors recommended for a particular batch.

Many people have their slides processed by a professional color lab, but would a local photo shop do just as well? Try both and judge for yourself. These days, even one-hour photo services have sophisticated equipment that can produce quality work, so don't automatically turn up your nose at them. Overall, however, professional labs provide greater quality control. They use fresh chemicals and closely monitor temperatures and times. Their results have to be right, since they often process the studio work of highly paid photographers.

For the quickest results, try using Polaroid's PolaChrome 35mm slide film, which can be developed in the compact desktop PowerProcessor without chemicals or fluids. When projected, these slides are slightly darker than Ektachrome because of the dense backing on the PolaChrome film, but this type of exposure can serve at least for quick-and-dirty proofing.

If you need multiple photographic prints, consider using negative film (such as Kodak Vericolor ASA 100) and let the local minilab process it and make prints. Expose the first few frames with a neutral gradient from white to black so the lab can adjust its printer colors to match this test pattern. Most minilabs optimize their printing for flesh tones, but computer-generated images run their own color gamut, so the gray scale is a great reference check.

You can also use self-developing print film such as Polaroid's 339, but extra copies require extra exposures — and a special camera back is required for the film recorder. If such a back is available for your recorder, this option provides an excellent way to proof slides before final processing (see "Back It Up" sidebar).

— James F. Dunn

Features of Digital Film Recorders

	AGFA Matrix ProColor	AGFA Matrix SlideWriter	ALL Still Light	Lasergraphics LFR	Mirus FilmPrinter	Polaroid Bravo	PT Montage FR1
General							
List price	$6,495	$11,795	$3,995	$9,750	$5,895*	$5,995	$6,995
Interface	SCSI	SCSI	NuBus card	SCSI	SCSI	SCSI	SCSI
Mac compatibility (min. system)	Mac II family	Mac II family	Mac II family	Mac Plus	SE/30, Mac II family	SE/30, Mac II family	SE, SE/30, Mac II family
IBM compatibility (add. cost)	$1,995	$1,995	NA	$1,845	NA	NA	$2,495
Bits per pixel (draft/full color)	24 bpp	24 bpp	15/24 bpp	21/24 bpp	3/24 bpp	3/24 bpp	21/24 bpp
2K resolution (pixels)	2,048 x 1,366	2,048 x 1,366	2,048 x 1,920†	2,048 x 1,365	2,000 x 1,333†	2,000 x 1,333†	2,048 x 1,365
4K resolution (pixels)	4,096 x 2,732	4,096 x 2,732	NA	4,096 x 2,731	4,000 x 2,666	4,000 x 2,666	4,096 x 2,731
CRT diagonal size (inches)	7 in.	7 in.	3 in.	6 in.	2.76 in.	2.76 in.	3 in.
Pixel size (millimeters)	.1 mm	.05 mm	.05 mm	.04 mm	.04 mm	.04 mm	.05 mm
Camera type	Pentax	Pentax	Mamiya	Pentax	Konica	Konica	Pentax
Rewind	hand crank	hand crank	motorized automatic	motorized	hand crank	hand crank	motorized
Film type (recommended)	Ektachrome 100 Pro	Ektachrome 100 Pro	Ektachrome 100 HC	Ektachrome 100 HC	Ektachrome 200 Pro	Presentation Chrome	Ektachrome 100 HC
Dimensions (L x W x H, inches)	20 x 15 x 11	18 x 12 x 36	16.9 x 7.8 x 5.9	25 x 9.9 x 8.6	8.5 x 19.1 x 5.5	8.5 x 19.1 x 5.5	17 x 14.25 x 6.5
Weight (pounds)	38 lb	42 lb	10 lb	33 lb	16 lb	16 lb	20 lb
Warranty	1 year	90 days	90 days	90 days	1 year	1 year	90 days
Image processing							
Software	Conductor 2.2	Conductor 2.2	Still Light 2.6	MacRascol 1.03	MirusImage-MAC 2.01	MirusImage-MAC 2.01	ImageQ 2.0
RAM (megabytes)	2–4 MB	2–4 MB	2 MB	2 MB	4 MB	4 MB	2.5–4 MB
Hard-disk space	4 MB	4 MB	NA	1 MB	image file size	image file size	2 MB**
Software interface	application	application	application	application & DA◊	Chooser & application	Chooser & application	application & DA
Image compatibility	PICT, PICT2, Scrapbook, Clipboard, TIFF	PICT, PICT2, Scrapbook, Clipboard, TIFF	PICT, PICT2, Scrapbook, EPSF w/ PICT comments	PICT, PICT2, Scrapbook, Clipboard	any QuickDraw application	any QuickDraw application	PICT, PICT2, Scrapbook, Clipboard
Supports 24-bit images	yes	yes	no§	no◊	yes	yes	yes
Outline fonts supplied	13	13	none§	13	13	13	43
Software options	NA	NA	NA	35 outline fonts, $895	22 outline fonts, $595	22 outline fonts, $595	Chooser driver, $495
Color-printer support	yes	yes	no	yes	no	no	no
Backgrounding in MultiFinder	no	no	no	yes	no	no	yes
Color-balance controls	RGB	none	RGB, brightness	RGB, contrast	RGB, brightness, contrast	RGB, brightness, contrast	RGB, contrast
Image controls	crop, zoom, rotation	crop, zoom, rotation	zoom	crop, zoom	none	none	crop, zoom
Background coloring	yes	yes	no	yes	yes	yes	yes
Colorizing of objects/text	patterns, bit maps, text	patterns, bit maps, text	no	patterns, text	no	no	patterns, text
Font-substitution control	no	no	no	yes	no	no	yes
Film backs							
Polaroid 339	$1,095	NA	$395	$1,495	NA	NA	NA
Polaroid 669/691	NA	NA	included	$1,595	NA	NA	$895§§
Bulk-load 35mm	NA	$8,900	$6,995	$4,750	NA	NA	NA
Pin-registered 35mm	NA	$8,900††	$6,995	$9,550	NA	NA	NA
4-x-5-inch transparency	NA	NA	$1,395	$1,595	NA	NA	NA

*Price will drop to $4,995 when the FilmPrinter Plus ships.
†1K (draft) resolution is also available.
§Still Light 3.0, which supports 24-bit color and outline fonts, should be shipping by now.
◊MacRascol 1.04, now shipping, supports 24-bit color and includes a Chooser driver.
**Recommended hard-disk space for optional Chooser driver is 10 MB.
††Bulk-loading camera is also pin-registered.
§§Also included: overhead-projector adapter for 691 transparencies, drying rack with digital timer, and carrying case.

Capsule Reviews



PHOTOGRAPHY: FRED STIMSON

The film recorders (clockwise from top): SlideWriter, FilmPrinter, LFR, Bravo, ProColor, Montage FR1, and Still Light.

ProColor. . . . . ★★★½

This is a good product at a good price. Although it doesn't excel in any particular area, it's a solid performer. But it does have one crippling flaw: severe color banding and tinted grays. On the positive side, AGFA's Conductor software is a delight to use, with the best queueing options of all the software tested. You can specify resolution and font quality for each image, rearrange image order in the queue, and select output to other Matrix devices. You can even add an entire folder as a single queue entry.

Pros: Best software. Easiest to use. Smooth line imaging. Excellent printing-progress dialog box. Supports color thermal printers. **Cons:** Severely tinted grays and heavily banded color gradients. Thin lines fattened to several pixels. Hardware RGB controls. Single SCSI port. Must remove cover to change SCSI ID.

AGFA Matrix
One Ramland Road
Orangeburg, NY 10962
(800) 876-7543 or (914) 365-0190
$6,495

SlideWriter. . . . ★★★★

This model is twice as sharp as the ProColor, at nearly twice the price. It uses the same Conductor software (see ProColor capsule for a description). Unfortunately, it also has the same problems with color banding. Physically, the SlideWriter is a hefty floor-standing unit equipped with wheels.

Pros: Sharp images and text. Best software. Easiest to use. Smooth line imaging. Informative panel indicators. Supports color thermal printers. **Cons:** No RGB controls. Thin lines fattened to several pixels. Severely tinted grays and heavily banded color gradients. Big. Expensive.

AGFA Matrix
One Ramland Road
Orangeburg, NY 10962
(800) 876-7543 or (914) 365-0190
$11,795

Still Light . . . . . ★★★

This no-frills unit has only fair performance and limited options, but it has an unbeatable price. The Still Light uses a NuBus card instead of being a SCSI device. Setup is easy: Drop in the card, connect the cable, and go. The Still Light software can open only PICT files or batch queues, but a separate utility can create PICT files from Scrapbook files and EPSF files containing PICT comments. Software settings can't be changed for individual files. Version 3.0 of the software should be available; it includes 24-bit color and Bitstream outline fonts.

Pros: Least expensive. Easy-loading 35mm camera. Polaroid 669/691 back included, and Polaroid 339 back very inexpensive. Informative dialog box during printing process. Built-in timer for Polaroids. Name/time/date stamping on film. **Cons:** No 4K mode. Fair color and image geometry. No outline fonts. Poor text quality. Thin lines fattened to several pixels. Jagged images when projected. Limited software controls.

American Liquid Light, Inc.
2341 205th St., No. 116
Torrance, CA 90501
(213) 618-0274
$3,995

LFR. . . . . ★★★★★

This one's a screamer — it churned out slides up to five times faster than its competition and had the best resolution and text quality to boot. The MacRascol DA lets you queue slides from within applications for later printing. As with the other machines, the LFR requires 2 megabytes of RAM, but it's the only one that can work with a Mac Plus. MacRascol 1.04, now shipping, supports 24-bit color and includes a Chooser driver; the upgrade is free. These new goodies make the LFR's high price tag a lot easier to swallow.

Pros: Best images overall. Superior resolution and text quality. Fastest imaging times. DA for queuing files. Backgrounds in MultiFinder. Extensive software features, including font-substitution control. Supports color thermal and ink-jet printers. **Cons:** Fair image geometry. Annoying whine on some units. Expensive.

Lasergraphics, Inc.
17671 Cowan Ave.
Irvine, CA 92714
(714) 660-9497
$9,750

FilmPrinter. . . . ★★★½

The FilmPrinter is a study in extremes. It has the best color we've seen, but it's also amazingly slow, trailed only by its sibling, the Bravo. It's the most ergonomically designed film recorder we tested. The camera points down into the unit, and film easily loads from the top. It uses both a Chooser driver and the MirusPrint queuing application to get images onto film. The Chooser driver lets you print from within applications, but it requires too many decisions and mouse clicks along the way.

Pros: Superb color; neutral grays. Color gradients had no banding. Informative dialog box during printing process. **Cons:** Very slow imaging times. Fuzzy slides when projected to large sizes; small text hard to read. Thin lines

jagged and fattened to several pixels. Awkward software interface. No image controls.

Mirus Corp.
4301 Great America Parkway
Santa Clara, CA 95054
(408) 980-9770
$5,895

Bravo . . . . . ★★★

Like the FilmPrinter, the Bravo offers superb color — and lethal imaging times. Overnight batching is the rule here, rather than the exception. The Bravo is identical to the Mirus in basic design, setup, operation, and functionality. It uses the Mirus Chooser driver, queuing software, fonts, and manuals (see Mirus capsule for details). It also uses Polaroid Presentation Chrome film, a high-contrast film made specifically for film recorders. We had trouble finding this film; fortunately, the Bravo actually images faster if you use Ektrachrome 200 Pro instead.

Pros: Eye-grabbing colors. Vivid reds. Informative dialog box during printing process. A 90-day money-back guarantee. **Cons:** Abysmally slow imaging times. Fuzzy slides when projected to large sizes. Small text hard to read. Thin lines jagged and fattened to several pixels. Awkward software interface. No image controls. Recommended film hard to find.

Polaroid Corp.
549 Technology Square
Cambridge, MA 02139
(617) 577-2000
$5,995

Montage FR1 ★★★★½

This unit offers sharp images and short imaging times, and it also looks good, thanks to a cover that hides the front-loading camera from sight. It uses a MacRascol work-alike software package called ImageQ (see the LFR capsule for details).

Pros: Fast imaging times. Sharp images. Thin lines printed thinly, but not quite as thin as LFR's. Backgrounds under MultiFinder. Font-substitution control. Includes 43 fonts. DA for queuing files. **Cons:** Slightly fuzzy slides when projected to large sizes.

Presentation Technologies, Inc.
743 N. Pastoria Ave.
Sunnyvale, CA 94086
(800) 782-2543 or (408) 749-1959
$6,995

The Still Light is the only film recorder that doesn't use outline fonts. It works only with bit-mapped screen fonts, which is a severe disadvantage, textwise. However, version 3.0 of its software (which should be shipping by now) will include Bitstream's outline versions of Times, Helvetica, and Symbol, plus user control over font substitution. The upgrade should also support Bitstream's downloadable fonts. The Still Light is thus poised to become the first film recorder to support downloadable fonts, which greatly increases the number of fonts available for slide making.

To test text quality, we created an eye chart of Helvetica and Times type in sizes from 9 to 72 points. The resulting slides were judged on sharpness, font quality, kerning, and readability of the smaller font sizes. All the recorders with outline fonts produced acceptable character shapes (see Figure 6). As you might expect with their superior resolutions, the LFR and SlideWriter were the champs, with crisp type at every point size. The FilmPrinter and Bravo, on the other hand, had fuzzy text, with sizes below 24 points becoming almost unreadable. The Still Light, with its bit-mapped fonts, pulled up lame. It displayed distinct jaggies at every point size, and the smaller fonts were unreadable blobs.

Fast Forward

Imaging speed is the make-or-break point for some people. Faced with unyielding deadlines and implacable bosses, they want those slides *now*. Digital film recorders, unfortunately, have a deserved reputation as slugs in this respect. MacUser Labs conducted its own time trials, using three worst-case scenarios created in PowerPoint: the text eye chart, a simple bar chart, and a pie chart with a background gradient. The slides were

Back It Up

Back is nothing more than photographic jargon for *camera*. All film recorders have a 35mm back for general use, and some have optional backs for special purposes. The most common backs are the Polaroid 669/691, Polaroid 339, bulk-loading 35mm, pin-registered 35mm, and one for creating 4-x-5–inch transparencies. The LFR and Still Light recorders each offer all five backs; the LFR's backs are pricey options, whereas the Still Light includes the Polaroid 669/691 back with the film recorder and the Polaroid 339 costs only $395. The FilmPrinter and Bravo recorders have no back options; their 35mm Konica cameras are bolted on and can't be removed without ruining the recorder's calibration. (For additional details, see "Features of Digital Film Recorders" table.)

The Polaroid 669/691 back produces 4.25-x-3.25–inch prints and transparencies. Polaroid 669 is a professional color-print film used for proofing images before printing to slide film. Polaroid 691 is a professional transparency film. Each 691 film package comes with cardboard mounts to keep the transparencies fingerprint-free, and a special adapter can make the transparency size conform to the requirements of most overhead projectors. Polaroid 669 and 691 films are pull-and-peel types that require you to wait a specified time before pulling off the negative. The process is messy; prints and transparencies take an hour to dry, and the chemicals can get on your hands and clothing.

If you want mess-free prints for proofs or handouts, choose the Polaroid 339 back. The 339 film is the more familiar SX-70 type, where the negative and developing chemicals are contained inside the print. Plus, 339 film has an ample 7/8-inch margin across the bottom of each print for easy handling and labeling.

Bulk-loading backs overcome the 36-exposure limit of 35mm film canisters by letting you expose up to 100 feet of film at a time. They are ideal if you need to produce several slide shows at once or want to batch-process slides overnight.

Standard 35mm cameras don't have the mechanics necessary to place each exposure exactly where it belongs on the film. Pin-registered backs overcome this deficiency by offering precise alignment from frame to frame — a necessity if you're recording images for a multiprojector show or for movie animation.

A 4-x-5-inch–transparency back creates high-quality images that can be color-separated for use in annual reports, magazines, or color brochures. The 35mm format is too small for professional printing, and graininess can obscure the clarity of printed images. A 4-x-5–inch transparency gives you a much sharper image with less grain and more-vivid color.

— Jeff Pittelkau



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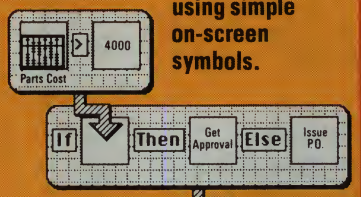
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Figure 4: Over the Rainbow



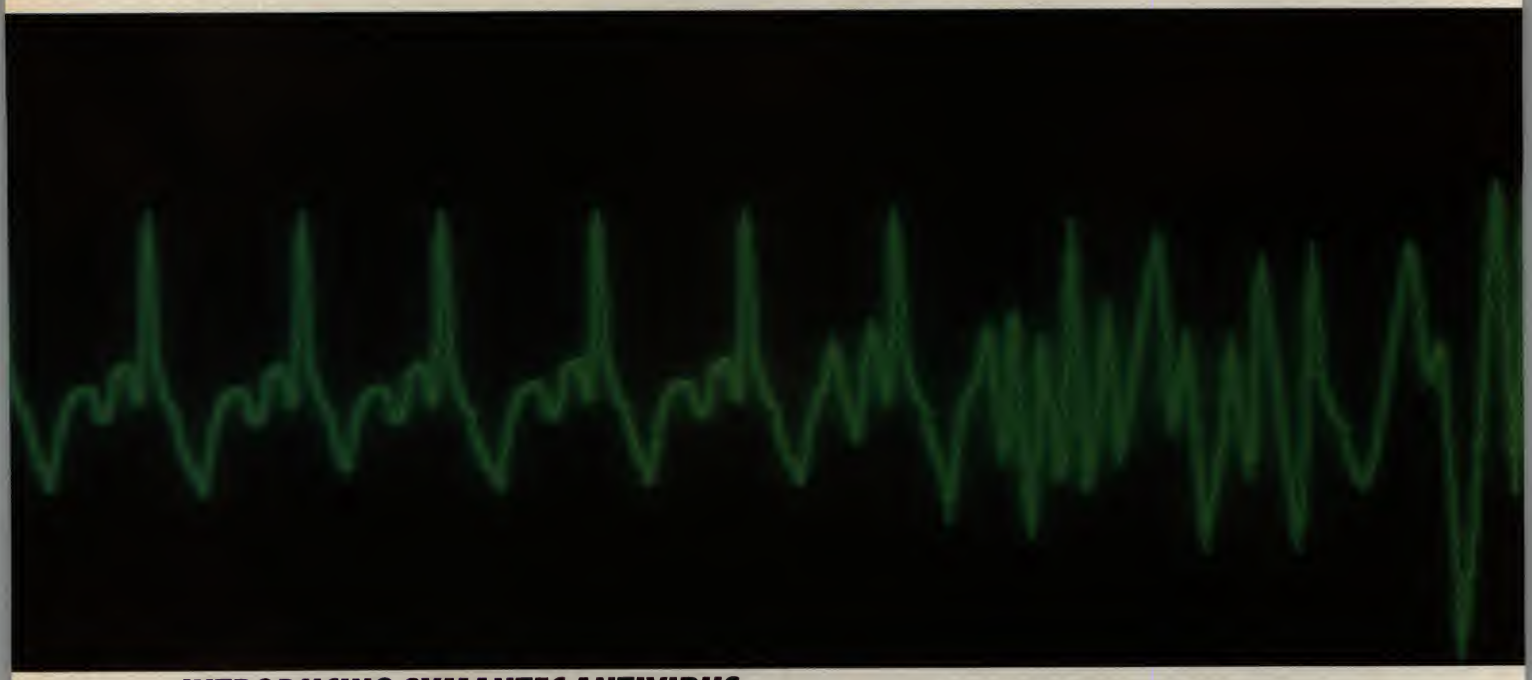
Color gradients are a film recorder's worst nightmare, but the Mirus FilmPrinter didn't even break a sweat. Its gradient (left) is so smooth we couldn't see any transitions. The AGFA ProColor displays heavy banding, despite its use of professional film.

imaged at both 2K and 4K (except on the Still Light, which has only 2K), and the recorders were clocked from the instant we released the mouse button after selecting OK in the Print dialog box until we regained control of the Mac.

The good news is that most of the recorders can make a slide in less than ten minutes (see Figure 8). The bad news is that if you need to make a lot of slides, you'll have to batch them overnight or you'll never get your Mac back. Once you issue the Print command, the software takes control of the Mac until imaging is completed. If you think MultiFinder will provide you with an escape hatch, think again. All the recorders let you add images to batch queues under MultiFinder, but only the LFR and Montage process slides in the background, leaving your Mac available for other applications.

The bar chart proved to be the easiest image, while the text slide caused problems for several recorders. The results weren't uniform, however. What gave one recorder trouble was a piece of, well . . . pie for another. Some recorders were two or three times faster at 2K than at 4K. If a recorder produces acceptable slides at the lower resolution, you can reduce imaging time by up to 50 percent. For some recorders, the time difference was relatively small, but even a minute here and a minute there can add up to hours when you're shooting many slides.

The undisputed speed champ was the LFR, with the Montage running a respectable second. The LFR is so fast at 2K resolution that you can process 36 slides — enough for two or three average presentations — in only 1 1/2 hours (that's



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2½ minutes per slide). It is five times faster than the Bravo, the slowest recorder. The LFR's worst time was for producing the 4K pie chart — a mere 5:16. By comparison, the *fastest* time for the Bravo was 12:29 for the 2K pie chart; its worst performance was an excruciating 19:22 for the 4K text slide. The FilmPrinter didn't fare much better, averaging almost ten minutes per slide. The AGFA recorders and the Still Light took two to ten minutes, depending on image and resolution.

Figure 5: Shades of Gray



The Mirus FilmPrinter blazed through the gray-scale test, showing smooth, neutral shading (left). The AGFA ProColor again fared poorly, producing a banded gray scale heavily tinged with color.

The Look and Feel

Film-recorder software is a curious mixture of applications, DAs, and Chooser drivers. All the recorders except the FilmPrinter and Bravo come with a standalone application that accepts PICT and PICT2 images as well as images imported through Scrapbook files or the Clipboard. None of the recorders support PostScript, but new software solutions are in the offing (see "On the Horizon" sidebar). Lasergraphics makes the software for both the LFR and Montage recorders; it includes a DA that lets you add files to a print queue without leaving your current program. You can then run the main application to select film type, resolution, and so on before exposing the film.

The FilmPrinter and Bravo use a Chooser driver, which enables you to print an image directly from an application. (The Montage has an optional Chooser driver for $495, and the newest version of MacRascol, the LFR's software, also includes a Chooser driver.) Simply select the driver in the Chooser,



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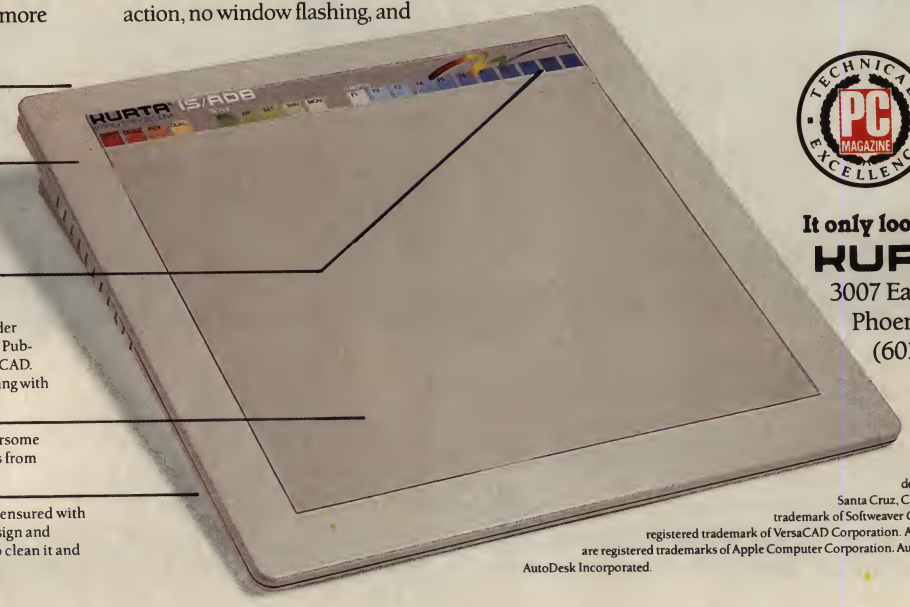
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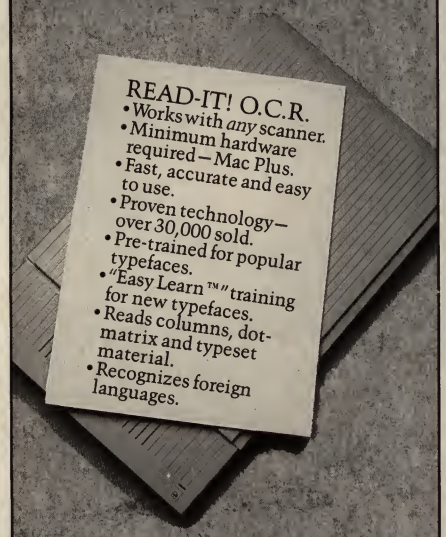
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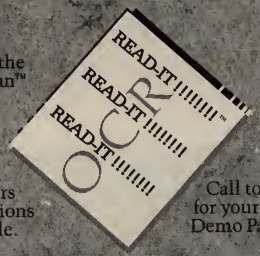
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and the Print command will generate a dialog box specific to the film recorder, complete with whatever options are available. This direct approach is especially beneficial for programs such as PowerPoint and Cricket Presents, which don't create PICT files. Instead of fiddling with intermediary file formats, simply issue the Print command and — boom — the image is transferred to film. (Even without a Chooser driver, you can print directly from Visual Business No. 5, the only Mac program that can drive film recorders. Its Output Manager utility can print directly to all the recorders except the Still Light.)

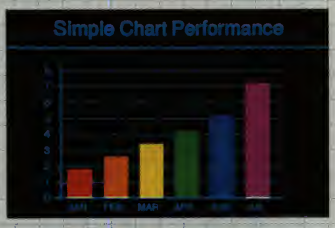
The recorder software varied tremendously in power and ease of use. All the packages can print individual images or add the filenames to a queue for batch processing. You can always preview images before processing them, and if you don't like what you see, some of the software programs offer tools for scaling and cropping. AGFA's Conductor software even lets you rotate images 90 degrees. Other basic settings include resolution (2K or 4K), film type, color bits per pixel, and slide orientation (horizontal or vertical).

Our favorite software was Conductor 2.2, which graces AGFA's ProColor and SlideWriter (see Figure 7). Its sophisticated and user-friendly interface is delightful to use, with pop-up windows for customizable settings and easy click-and-drag rearranging of files that are awaiting exposure. You can even enter an entire folder as a single queue entry. The features list includes background coloring (adding a specified color to the edges of an image when it doesn't fill the slide), support for fractional font spacing, and the ability to convert black-and-white

Presentations Plus

General Parametrics is marketing the $4,495 PhotoMetric SlideMaker 250 for its VideoShow presentation products. This isn't a film recorder for the Mac, per se, although it can process images imported from the Mac. Its direct link is to the VideoShow, a portable box that plugs into a monitor and is used for desktop presentations (see this month's StartUp Reviews). When we pushed it to the limit with our standard test images, we got back slides of very poor quality, so we pulled the SlideMaker aside and looked at what it could do with the VideoShow and its StarTime software for the Macintosh.





The PhotoMetric SlideMaker imploded when fed our gray-scale test image (top). It fared better with a simple bar chart that had few colors and limited graphic information.

Using a Mac Plus and Microsoft PowerPoint, we copied our simple bar chart to the Clipboard as a black-and-white image. We then opened the StarTime software; pasted the image into a blank worksheet; and used StarTime to color the lines, bars, and text. When we were satisfied with the colored slide, we downloaded it to the VideoShow and pressed a few keys, and SlideMaker imaged the slide at 4K resolution on Ektachrome 100 HC film in 5.3 minutes.

The PhotoMetric SlideMaker is definitely not for power slide users. If you're picky about colors and like jazzy background effects, you won't be satisfied. The VideoShow's image-compression process also removes some fine details from slides, although StarTime warns you when it's about to simplify an image. The SlideMaker is aimed at the installed base of VideoShow owners. It's also ideally suited to Mac Plus or SE users who want to create simple color slides without a lot of hassle and who have access to a VideoShow setup. For more information, contact General Parametrics Corp., 1250 Ninth St., Berkeley, CA 94710; (415) 524-3950.

— Jeff Pittelkau

On the Horizon

Ask film-recorder users what feature they'd most like to have, and you'll probably hear a chorus of "PostScript compatibility." PostScript graphics from programs such as Illustrator 88 and FreeHand presently can't be sent directly to film recorders. You can use only the PICT image that's embedded in the PostScript graphic — the underlying PostScript is, in effect, lost. The PICT image goes into the recorder software via the Scrapbook or the Clipboard. The quality of this PICT image will determine the quality of the finished slide, and PICT quality can vary from program to program.

But progress is being made. AGFA will soon market an Adobe PostScript RIP (raster-image processor) for its film recorders. The bad news is that the unit will list for $17,900 — more than the recorders themselves.





If you print an Illustrator file on a film recorder such as the FilmPrinter, you'll be disappointed (top). But if you use Freedom of Press software to print a PostScript file of the same image on an LFR, you'll get an accurate image in color and with the correct fonts.

A less expensive alternative is Freedom of Press, a software solution for the Montage FR1 and the Lasergraphics LFR from Custom Applications, Inc. (CAI), that should be available by now. (A deal for the Still Light is in the works.) Freedom of Press has been available for a year in the PC world, bringing the power of PostScript to non-PostScript printers. The program acts as an interpreter, converting PostScript into a form the printer or film recorder can understand. The quality and sharpness of the images produced should be better than those of PICT- based ones. The Mac version of Freedom of Press costs $495 and includes 35 outline fonts plus a font-scaling system that allows arbitrary point sizes and rotation angles. Contact CAI at 900 Technology Park Drive, Building 8, Billerica, MA 01821; (508) 667-8585.

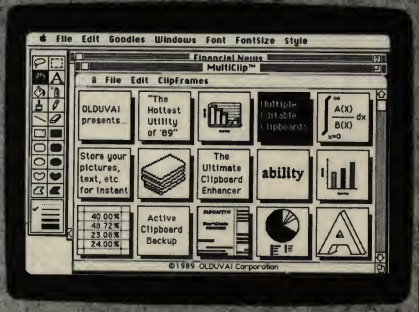
Not to be outdone, the TeleTypesetting Company is going to release a competing program called PostPrint. The software will be available in several forms for specific devices such as the LaserWriter IISC, CompuGraphic imagesetters, and — more germane to us — the Mirus FilmPrinter. Features include a preview window, PostScript editor, and MultiFinder compatibility. PostPrint, which will include 13 outline fonts and a QuickDraw driver, will sell for $295. The FilmPrinter module is an additional $295. The TeleTypesetting Co. is at 311 Harvard St., Brookline, MA 02146; (617) 734-9700.

Leaving the world of PostScript Mirus has announced the FilmPrinter Plus ($5,995), which sports a fully automatic Ricoh camera, a built-in parallel interface, and more-intuitive software. In addition, it has greater IBM connectivity, thanks to special DOS and Windows versions of the MirusImage software ($395 each). It is a much simpler and cheaper way to talk to Big Blue than are the $2,000 hardware interfaces offered by other recorder manufacturers. The Polaroid Bravo will be switching to this model as well, so you should keep your eyes open.

Version 2.1 of MirusImage-MAC is no longer bundled with the machine; it's now a $395 option. You can specify one film type for a batch, and the new camera works interactively with the software to keep track of available frames. If you miss an error message, a new time-out option will click on OK for you and continue the imaging process. An optional log file keeps track of errors. Finally, the FilmPrinter Plus is the first product to offer automatic rewind as a software feature; you can also have it shut your Macintosh off when a batch finishes printing.

— Gregory Wasson and Jeff Pittelkau

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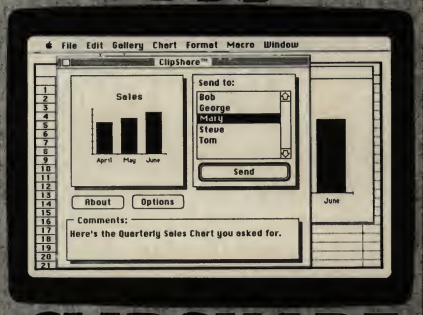
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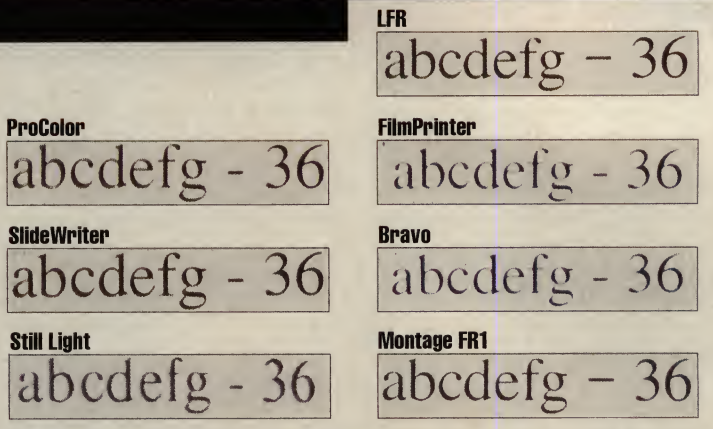
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Figure 6: Text Quality

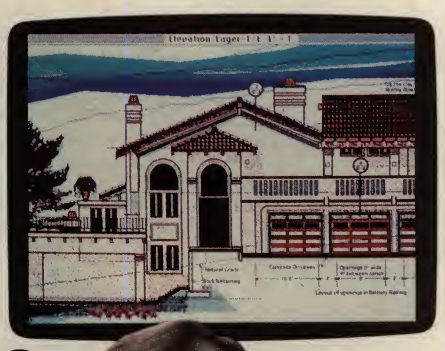
The recorders with outline fonts produced acceptable text at 4K resolution. The SlideWriter and LFR had the sharpest characters, especially at small sizes. Still Light text was jagged at each point size, because of its 2K resolution and bit-mapped fonts. These 36-point samples are 400 percent larger than their original slide size. As with the other images in this report, what you see here may not match what's projected on a screen, because the printing process alters the slides' appearance.

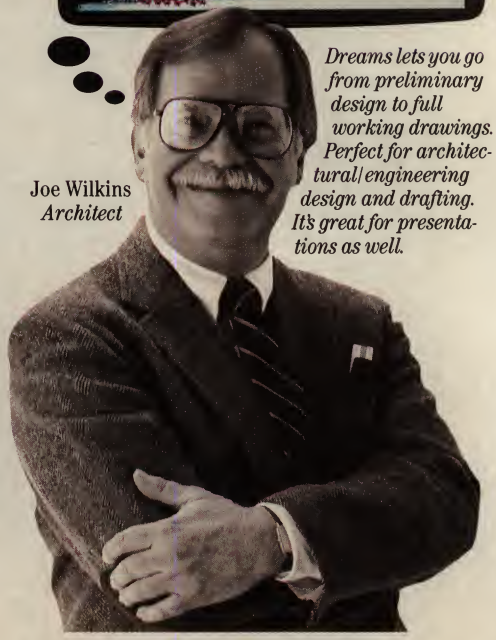


patterns and bit maps to color. Furthermore, Conductor supports color thermal printers and provides several halftone settings for optimizing the output. About the only features it lacks are controls for color balance and font substitution.

Other packages, particularly MacRascol (LFR) and ImageQ (Montage), offer almost as much — MacRascol supports both color thermal and ink-jet printers — but they're not as intuitive. Features are hidden in pull-down menus, and unless you read the manual, you may never see (or need) them. At the other extreme is Still Light, the no-frills package that accompanies the (you guessed it) Still Light recorder. It's easy to use, but it lacks many useful features. You can spool, preview, and process files — and that's about it. In general, settings affect the entire batch queue at once, with little

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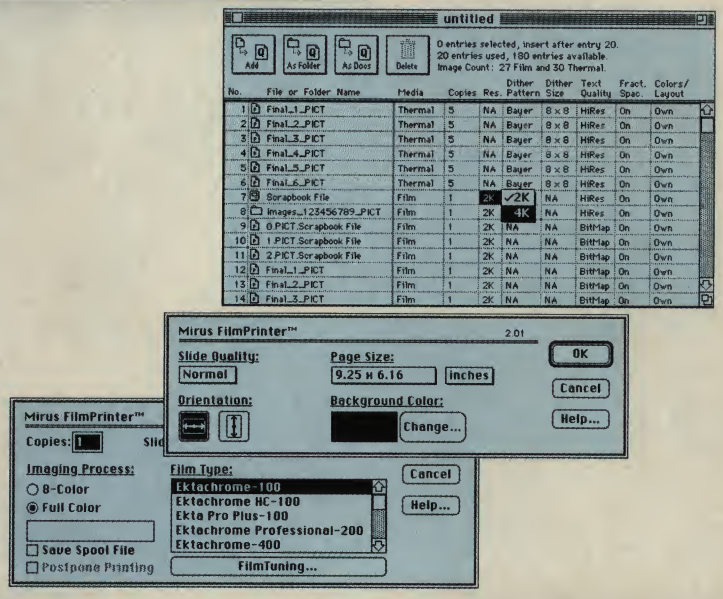
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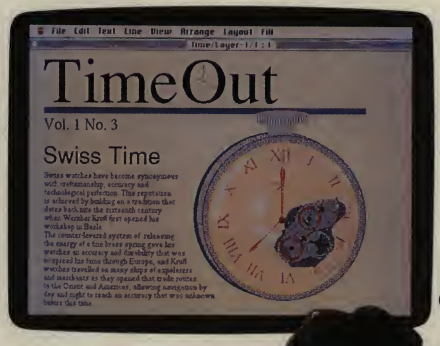
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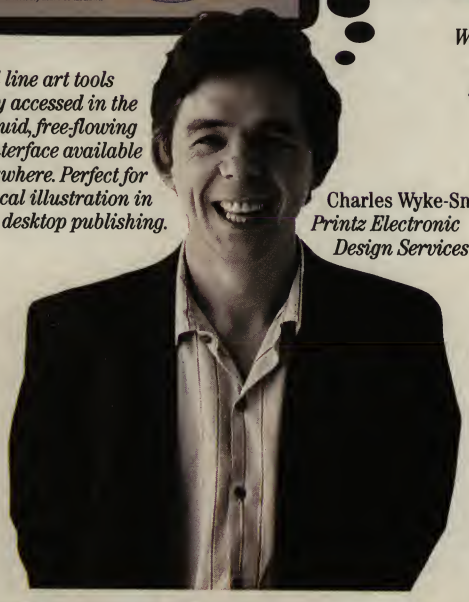
Figure 7: On Queue

AGFA's Conductor software (top) is a snap to use. This typical batch queue contains a combination of PICT files, multi-image Scrapbooks, and a folder of 12 images, all entered into the queue at once. Six images are headed for a color thermal printer, and a dither pattern has been selected to optimize their appearance. Each of the features — number of copies, resolution, text quality, and the like — can be individually set via pop-up menus. The Mirus FilmPrinter (bottom) isn't nearly as slick. It has a Chooser driver, so first you set Preferences in the Page Setup window and then make additional choices in the Print dialog box. All the settings revert to their defaults every time you begin a new image, so you have to make the rounds anew.





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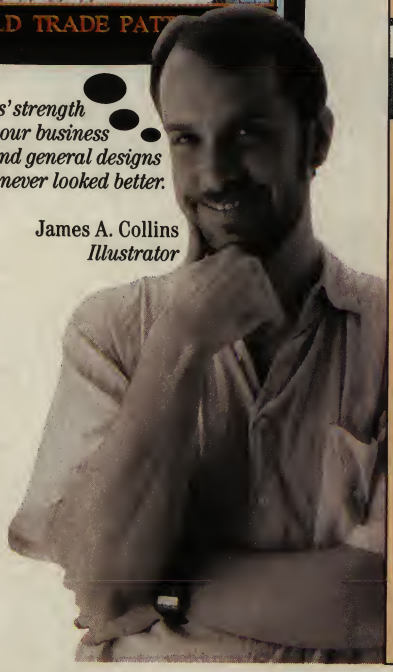


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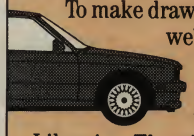
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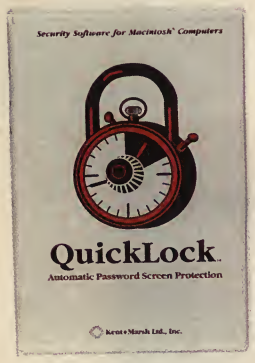
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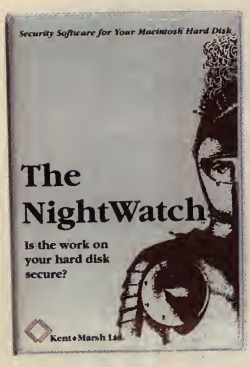
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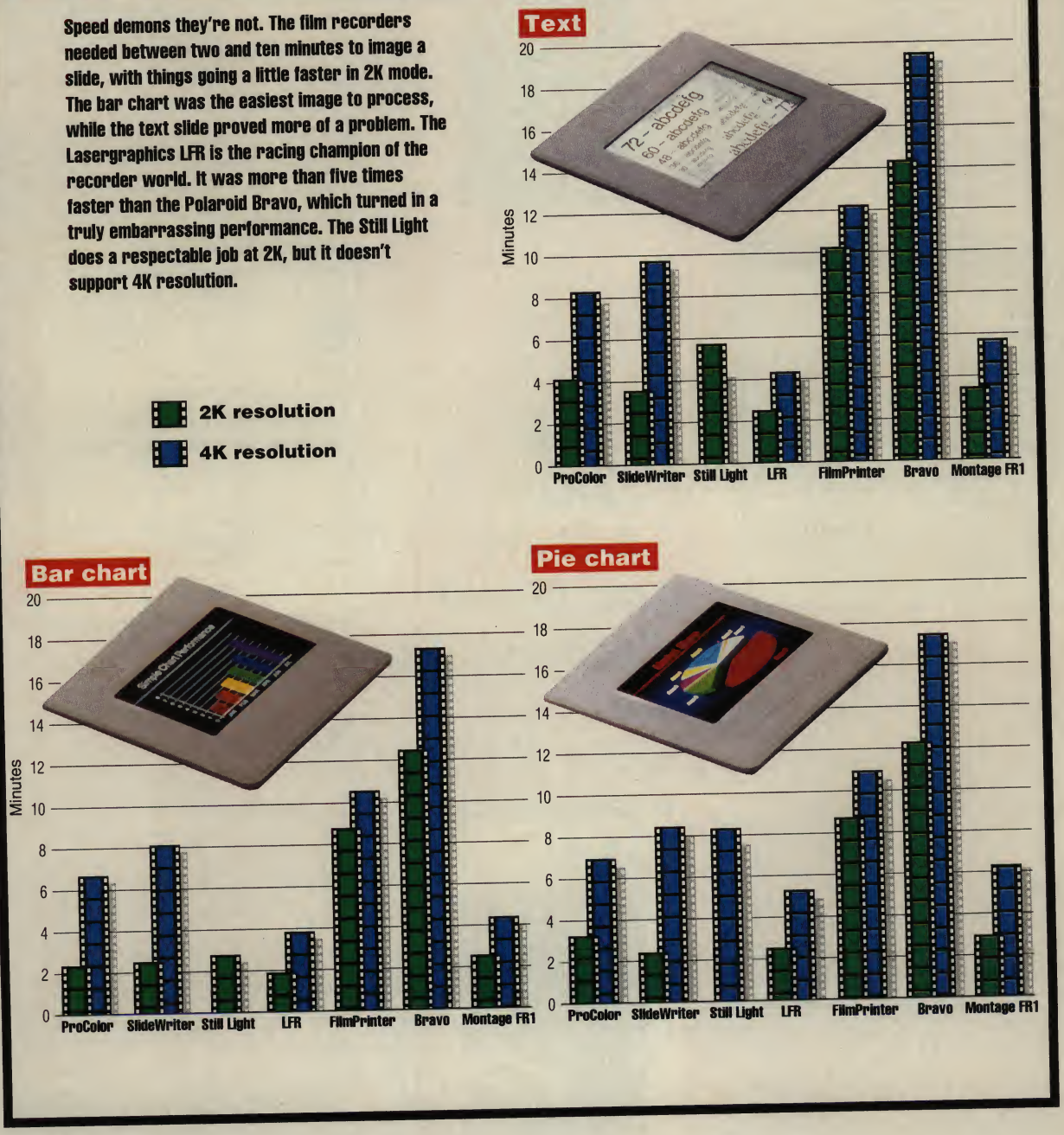
control over individual images.

In the case of the FilmPrinter and Bravo, extensive options can be an embarrassment of riches rather than a boon to users. The FilmPrinter driver has a clunky interface with too many settings that must be checked every time you spool an image. Some settings are in the Page Setup dialog box; others are part of the Print dialog box. The interface forces too many decisions on the user, and it's easy to make mistakes. For instance, you must specify the resolution, color quality, background color, and film type before you spool an image. If you forget and the wrong setting is the default, you cannot override the selection at batch-printing time.

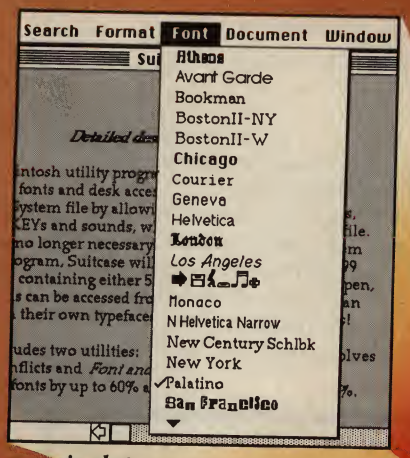
A final note: Be careful to keep your image size in the 3:2 aspect ratio used by slides, or portions of the image will be cropped off. Presentation software that's specifically designed to create slides — Persuasion, StandOut!, More II, and so

Figure 8: Timing Is Everything

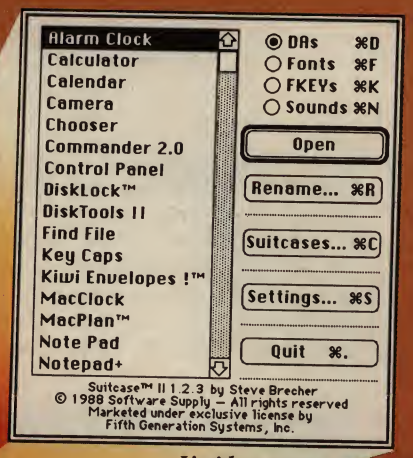
Speed demons they're not. The film recorders needed between two and ten minutes to image a slide, with things going a little faster in 2K mode. The bar chart was the easiest image to process, while the text slide proved more of a problem. The Lasergraphics LFR is the racing champion of the recorder world. It was more than five times faster than the Polaroid Bravo, which turned in a truly embarrassing performance. The Still Light does a respectable job at 2K, but it doesn't support 4K resolution.



Open The Window Of Font/DA Management Possibilities.

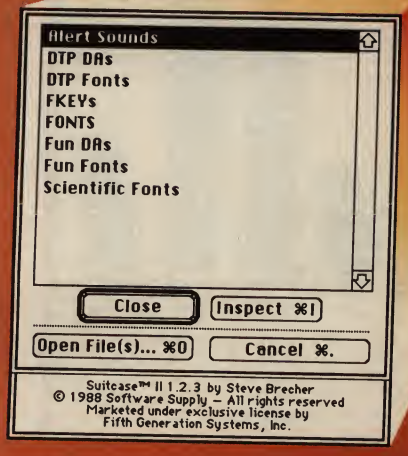


What you see is what you get—fonts are displayed in their own typeface in the application so you have the flexibility to be more creative and productive.

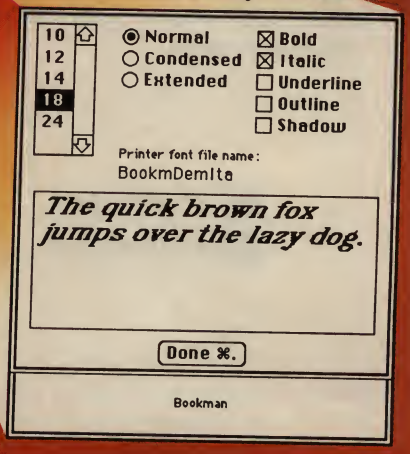


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on—have templates in the correct shape. If you're using another program, change the default page size from 8.5 x 11 inches to 6 x 9 inches to avoid unpleasant surprises at print time.

Film at Eleven

For many of those involved with this report, the results came as somewhat of a surprise. We had fully expected the recorders to be a major disappointment—but they weren't. The recorders are expensive, and each has a unique way of getting images to film. Although they can't attain the same quality as a setup from Genigraphics, these units come tantalizingly close. No recorder excelled in every category, though, which made picking an overall winner difficult (see "The Bottom Line" sidebar).

For superior resolution and text quality, nothing can touch the LFR and SlideWriter. For the smoothest, truest colors, the nod goes to the FilmPrinter and Bravo. If blinding speed is imperative, it's the LFR again, trailed by the Montage. Do you need full-featured software that's easy to learn? Check out AGFA's Conductor, used by the ProColor and SlideWriter recorders. And then there's the shoestring alternative, the Still Light.

But maybe you want to grab a few graphics and conduct your own investigation. For the best results, choose both simple and complex images and include simple geometric shapes (circles, squares), diagonal lines, lines of varying thicknesses, different type styles and sizes, lots of colors, some grays, and background gradients. And be sure not to forget your stopwatch!

Gregory Wasson is a contributing editor to *MacUser*. Jeff Pittelkau is an associate project leader in MacUser Labs. Aileen Abernathy is the senior editor/technology.

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MacUser Labs would like to thank the members of our advisory panel: James F. Dunn of Dunn Instruments, Bill Brown of the Computer Graphics Group, and David Haddick of David Haddick and Associates.

The Bottom Line

Current film recorders are expensive, and they can't deliver service-bureau quality to the desktop. So if you need only a few slides a month, stick with the service bureau. But how many presentations require professional-quality slides, anyway? If you're doing several presentations each month, seriously consider purchasing a digital film recorder, because it will quickly pay for itself. All the recorders produce acceptable slides with good color and resolution. Factor in speed, software features, and ease of use, and then decide which combination best fits your needs.

Our overall favorite is the Lasergraphics **LFR,** the only machine to come out on top in three tests. Although it's expensive ($9,750), the LFR delivers superior resolution, text quality, and blazing speed (relatively speaking). It has full-featured software (also used by the Montage) that can be used on a Mac Plus, and it backgrounds under MultiFinder—a real boon, considering the time a recorder takes to process slides.

If you like what the LFR has to offer but shudder at the price, consider Presentation Technologies' **Montage FR1** ($6,995). It performs almost as well as the LFR, uses the same software, and also backgrounds under MultiFinder. Plus, it comes with 43 fonts as opposed to the LFR's 13. Sure, it's a little slower and a little fuzzier, but it's also $3,000 cheaper.

The American Liquid Light **Still Light** is the Hyundai of film recorders. It lacks 4K resolution. Its test performance was only average. The software is limited, and there are no outline fonts (yet). But then again, it costs only $3,995. If you really want a film recorder but the prices give you nosebleeds, this could be your ticket. As long as you aren't overly concerned with getting the best image, the Still Light will serve you well.

The AGFA Matrix **SlideWriter** has superior resolution and text quality, equaling that of the LFR. Along with its sibling, the AGFA Matrix **ProColor** ($6,495), it uses Conductor software, which should set a standard for intuitiveness and ease of use. Unfortunately, both recorders have serious color deficiencies, including severely banded color gradients and tinted grays. At $11,795, the SlideWriter can't afford those kinds of defects.

We really can't recommend the Mirus entrants, the Mirus **FilmPrinter** ($5,895) and the Polaroid **Bravo** ($5,995). Although they have the smoothest and truest colors of all the recorders, their abysmally slow imaging times overshadow everything else. Their Chooser-based software is a good idea, but its clunky interface and confusion of choices leave room for improvement.

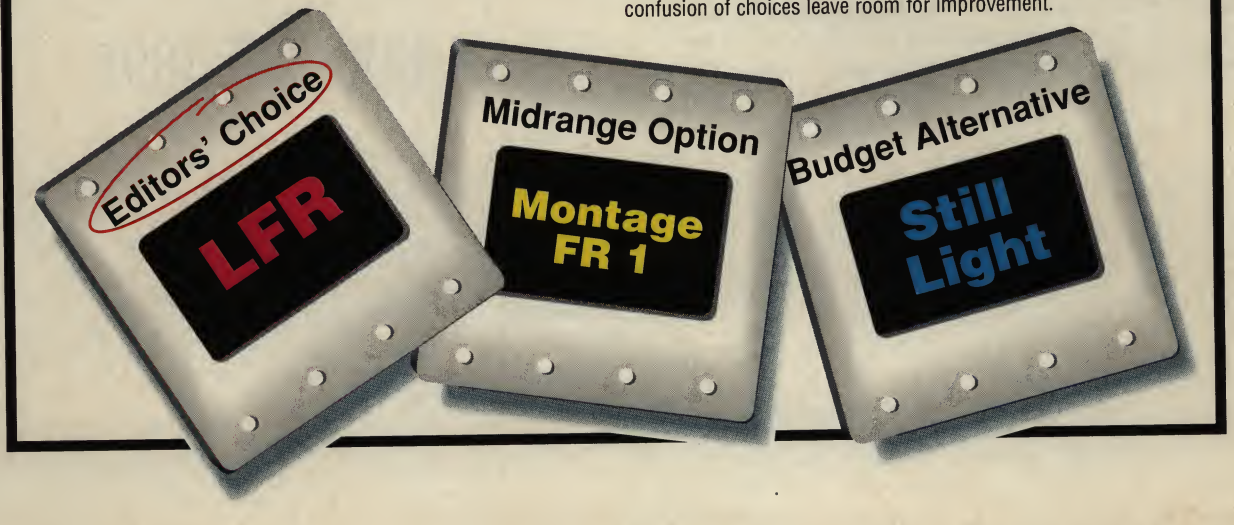


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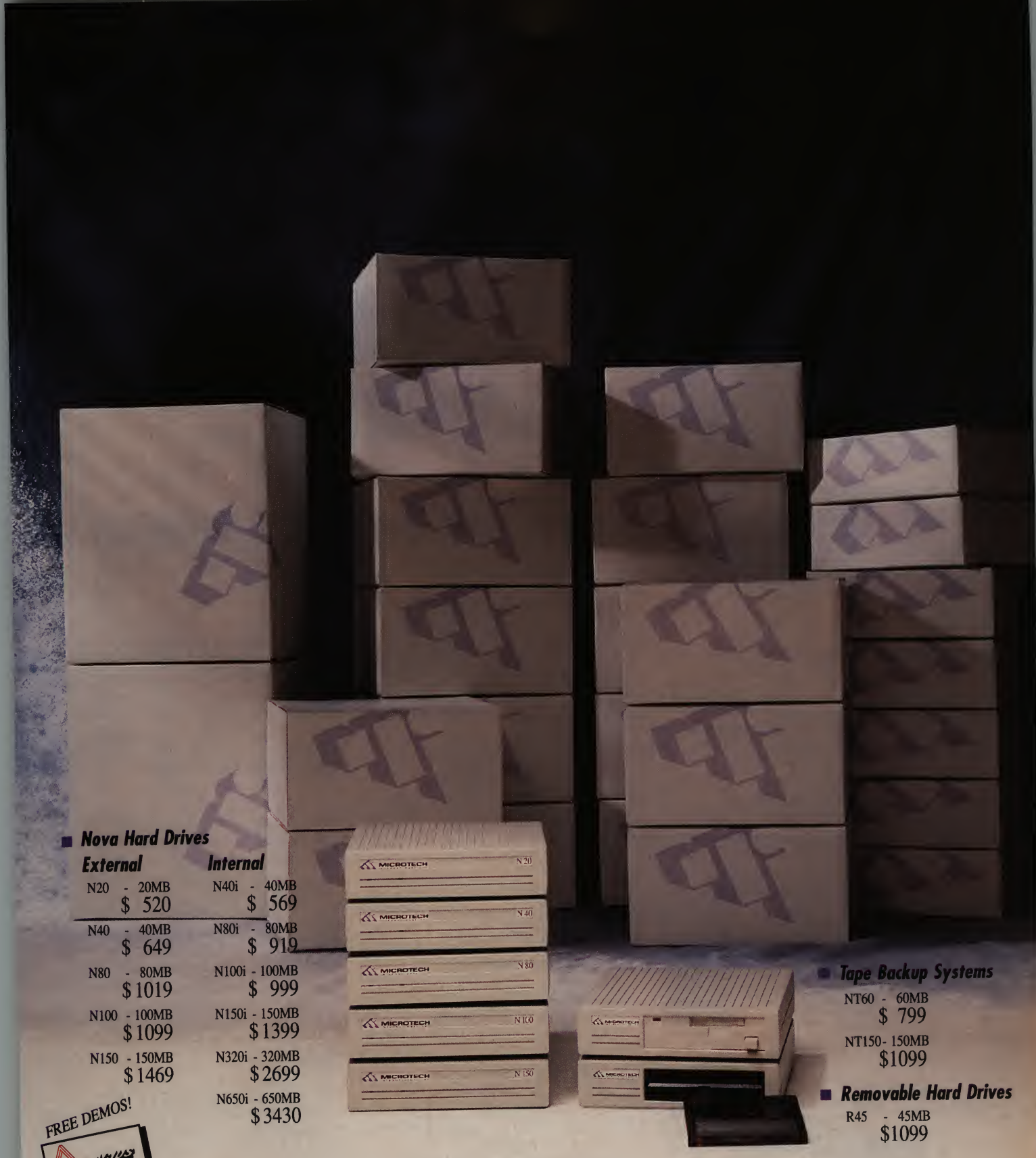
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Technically Speaking

Need to call technical support? Here are three easy steps to make that call a success.

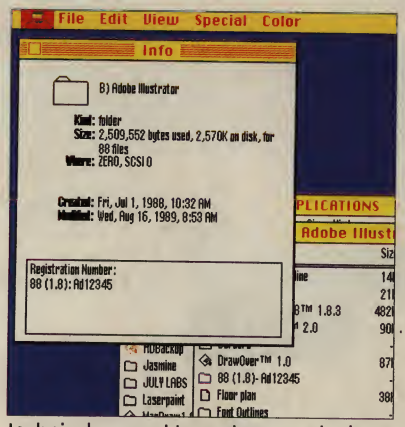
1. Before Trouble Starts

Prevention is the best medicine, and being prepared can speed the cure. In other words, an apple a day keeps the Apple doctor away.

Keep your registration information updated.

The first thing you should do before calling for technical assistance is also the first thing you should do when you open your software package: Write the software's registration and version numbers in the front and back of your manuals. Next, make sure you mail in the registration information.

Not only will you receive the latest information on program updates, but you'll also be entitled to technical support — many software companies don't provide



technical support to customers who have not registered.

Store the registration and program information where it is accessible. Jot down the information on paper or record it on your hard drive. I have a folder in my Adobe folder entitled "88(1.8):Ad12345," which means Adobe Illustrator 88, version 1.8, registration number Ad12345. Alternatively, type the registration and version numbers into the program's Get Info window. (This method should be used with caution, however, because rebuilding the desktop erases any information you've added to the Get Info window.) If you're on the road a lot, you might store the registration information for your applications in one file or folder that you can copy onto a disk to carry with you.

Know your Mac's configuration.

Regardless of why (or whether) you need to call for help, you should know your Macintosh's hardware and software configuration. Here's a checklist of the most important items:

- **The Mac's model.** Know whether yours is a 512K, Plus, SE, SE/30, II, IIx, or IIcx.
- **The System and Finder versions.** You can find the Finder's version by selecting About the Finder from the Apple menu. The System version is also displayed.
- **Memory capacity.** Selecting About the Finder from the Apple menu also tells you how much memory you have. A Macintosh's RAM can range from 512 kilobytes to 8 megabytes.
- **Hard-disk capacity.** The capacity of hard-disk drives ranges from tens to hundreds of megabytes. An easy method for finding out the capacity of a hard drive is to select View by Icon (or View by Small Icon) when any desktop window associated with the drive is selected. At the top of the window, you'll see the amount of disk space being used and, on the right, how much space is available. Adding those two values together tells you the drive's capacity.
- **External-monitor and video-card type.** Know the size and configuration of any external monitor and video card, such as an Apple monitor with a four-color card, a two-page black-and-white SuperMac monitor, or a full-page Radius monitor.
- **Expansion-board type.** Know whether you have any expansion boards, such as accelerators and memory-expansion kits.
- **Network type.** Find out what network you use, such as AppleShare or TOPS.
- **Output-device type.** Record your printers, plotters, or other output devices, such as LaserWriters, pen plotters, thermal printers, and ImageWriters.
- **Other software.** List all system-related software, such as print spoolers; INITs, such as Capture, Pyro!, and On Cue; cdevs, such as QuicKeys, SuperClock!, and SCSI Tools; and DAs. You may have to select these programs' icons and choose Get Info to find out their version numbers.

User groups distribute many free utilities, such as MacEnvy and Mug Shot, that automatically create a list of the Mac's attributes, including many of the ones listed above.

After you've obtained this information, type it into a word-processing document (or make copies of this checklist before you fill it out) and update the data as you make changes to your system. You can also paste the information into the Scrapbook, where it will be only a click away.



Your word processor is on liquefy, your relational database has gone flat, and your telecommunications program is silent. It's time to call technical support.

Calling a software company for technical support might seem fairly straightforward — pick up the phone, dial the number, explain the problem, and get an answer. But my experience as a technical-support specialist with Cricket Software has shown that when it comes to computers — even the Macintosh — things are rarely so cut-and-dried. Getting the most from a call to technical support involves much more than the call itself.

When you need help, the following three simple steps can prevent your call from being frustrating, time-consuming, and costly.

By Randy M. Zeitman

2. Before You Call

Just like the TV technician who fixes countless broken sets by checking to see if they're plugged in, you can avoid many crises by following this old dictum: When all else fails, read the directions.

Check the documentation first.

Read your manual. Most manuals have an index in the back to help you locate topics quickly. Many programs also provide on-line help. In most cases, the information you want is already in your hands.

A common misconception is that technical support is a substitute for your manual or that it is a source for free on-line training. The role of support specialists is really to solve more-complex problems — to help isolate a problem, suggest a workaround, or supplement or clarify information in your manual.

Document symptoms precisely.

You don't have to solve the problem yourself, but you do need to be able to describe the symptoms in as much detail as possible. Otherwise, calling for assistance is like phoning your mechanic and saying "my car doesn't go" without specifying whether it won't start, overheats, or has a flat tire.

Suppose you regularly experience a system bomb or your Mac's screen freezes from time to time. It's important to note what actions precede the problem as well as any ID number or other information that is displayed in the error message. Does the crash happen while you are choosing a particular tool or menu item? Does it happen at any other time?

3. Making the Call

You've checked the documentation, updated your registration and configuration data, and know more than you ever thought you needed to know about your Mac — but you still haven't solved the problem. Here are a few guidelines to make your call fast, informative, and painless:

Call backward.

Even after you've identified the apparent source of the problem, it's not always obvious which company you should call first. The choice is easy if you're working with only one program. But suppose you can't print a page-layout document that incorporates images from three graphics programs. Assuming that the printer works with other software, there's no obvious way to tell if the problem lies with the page-layout program or the graphics software. Instead of flipping a coin, go backward in the chain of software events to determine which company you should call first.

Call from near your Mac.

Use a phone next to your Mac with the problem program running and its manuals handy. Long-distance troubleshooting is an interactive process that often requires more than just conversation to be effective.

Get to the heart of the matter.

Communicate the root of the problem up front, specifying your concern first, rather than the steps that led up to it. For example, suppose that while running a spreadsheet program, you get an error message when you try to create a pie chart from some data. Relating the steps taken to enter and modify the data is much less important than reporting the error message that appears on the screen.

Once support specialists understand a problem, they can guide the remainder of the call. Chances are very good that they have seen the problem before and can offer a solution or workaround.

Give accurate, specific, and explicit information.

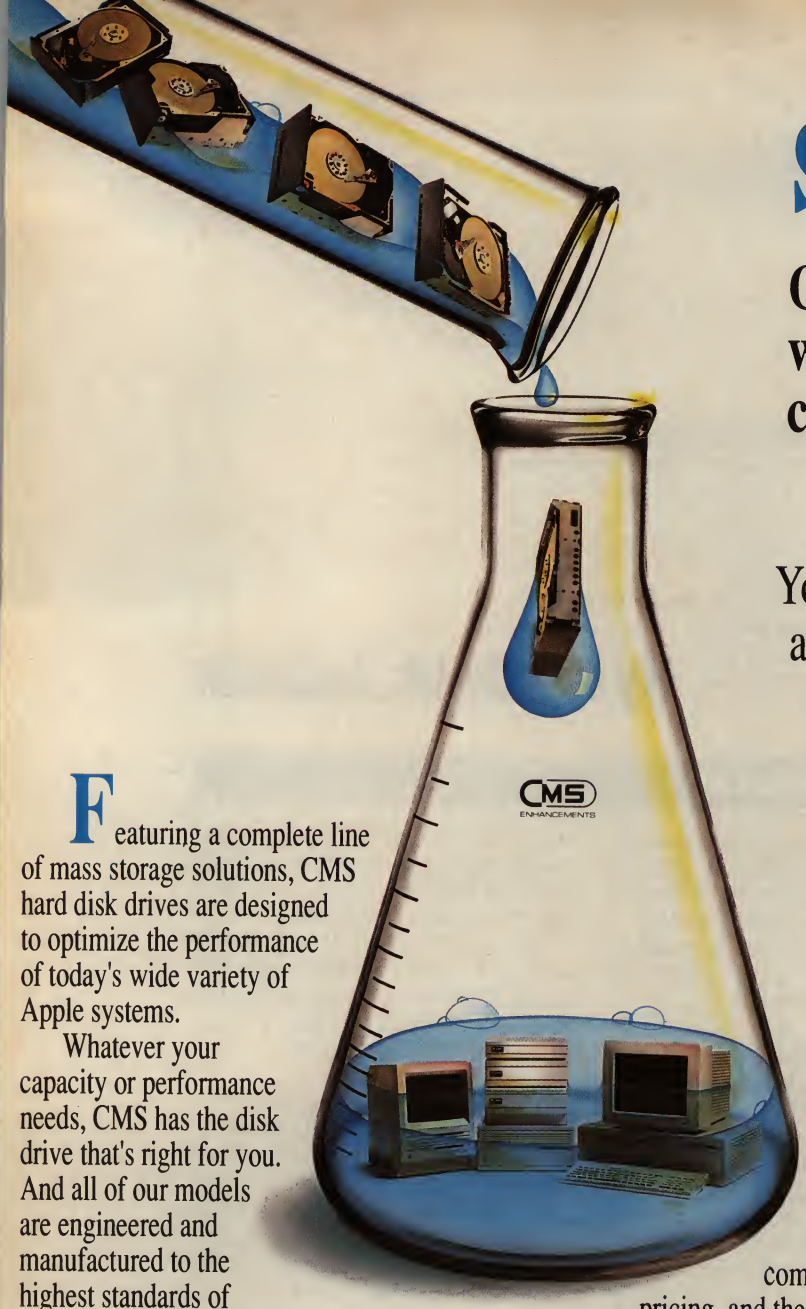
In the course of the conversation, you'll probably be asked additional questions about the problem. It's important that your answers be accurate and explicit, since the information you provide is all the support specialist has to work with.

Avoid using words with multiple meanings, particularly those that describe something about the Mac. In reference to a presentation program, "I've selected my text" doesn't mean the same thing to a technical-support specialist as "I have my text highlighted," because you could be referring to an object containing the text instead of to the text itself.

Failure to give explicit responses often results in a conversation that goes around in circles. If you don't understand a particular question or aren't exactly sure of your answer, say so.

Write down the name of the person with whom you spoke.

Some technical-support centers have 100 or more staff members on-line. If you don't note down the name of the person who helped you, you may have to start from scratch if you need to call back.



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BEATING THE SYSTEM

Inside the Finder

Most Mac users I meet seem to think that they can't modify the Finder or other System files, or that they shouldn't, because the process is dangerous and difficult. It is neither. Any Mac user can — and probably should — tweak the Finder.

This month we'll open the Finder and see what's inside. We'll see how to modify it to free up some memory you didn't know you had; teach your desktop to keep itself neat; and, if you have a color Mac, to modify the Color menu to make it easier to use color informatively. With the basic techniques covered this month, you should be able to go off on your own and examine and modify some of the more arcane features of the Finder, the System file, applications, utilities, and HyperCard stacks.

Along the way, we'll learn something about what Apple puts into its system software. Next year's arrival of System 7.0 should make some of the techniques discussed here easier, but it will also make it all the more compelling to know what's inside.



Figure 1: Resource editors such as Layout and ResEdit let you adjust the Finder's desktop. You can keep your desktop clean by changing the layout and grid drag capabilities, or you can simply alter the font size, style, and color. Whenever you're changing resources, work on a copy of the file.

What You'll Need

You'll need one of two utilities for this month's System beating: either ResEdit or Layout. ResEdit (up to version 1.2 as of this writing) is a powerful resource editor supplied by Apple. Layout is a free but copyrighted resource-editing tool by Michael O'Connor that is available on CompuServe or MacNET (I've been using version 1.7). Layout is the easier one to use, but it limits the extent to which you can edit a resource; it lets you modify only two of the Finder resources. ResEdit, on the other hand, can modify any resource in any file.

By Michael Swaine

Resources are the building blocks of Macintosh programs. Fonts, icons, menus, cursors, patterns, pictures, and templates for dialogs, alerts, and windows are all resources. Programming with resources lets Macintosh developers package elements of their programs' functionality into plug-in modules that can be replaced without touching a program's code, shared among applications, and changed by the users of the programs.

This holds true even for System files such as the Finder, which has many user-modifiable resources. With a resource editor, you can move, copy, and edit Finder resources by clicking on radio buttons, typing text, drawing in a FatBits window, selecting colors from the Color Picker, or using whatever editing technique is appropriate. In doing so, you will be changing the functionality of the Finder and customizing Apple's system software to your needs.

We will edit two of the Finder's resources.

Warnings, Reassurances, Maps

Properly used, neither of these tools is dangerous. Although it is possible to mess things up with ResEdit and at least to make problems for yourself with Layout, nothing discussed in this month's column will damage your Finder. ResEdit is not dangerous if you follow some simple guidelines: Never work on the master copy of a file, retain an extra copy on a floppy of any file you're modifying (in our case, the Finder), and use common sense (see Tip Sheet and "Personalize Your Mac," June '89, for more background on ResEdit).

ResEdit can be mysterious, but Layout is one of the simplest and clearest applications available. And even ResEdit can be easy to use, once you get past an initial learning hurdle. If you work through the examples in this column, you'll be over that hurdle.

Free Memory and Chained Icons

On our first foray into the Finder, we will concentrate on a very useful resource called LAYO resource ID 128. LAYO 128 controls the layout of the desktop — which explains the name LAYO and also the name of the Layout



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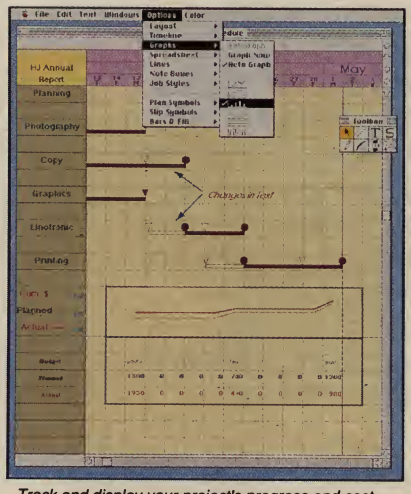
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program. We'll do two things to LAYO 128, and we'll do them with Layout and ResEdit.

To start, we'll lower the Max Windows value in the Finder's LAYO resource to make more memory available for applications. The Macintosh allocates memory for a predefined maximum number (normally 13) of windows at startup, and we can trade some of these potential windows for more memory. (Alternatively, you can trade some memory for more windows by increasing the Max Windows value.) Note that if you set the Max Windows value too low, applications that open many windows may not be able to work properly.

Next we'll turn on Always Grid Drags, another option of the Finder's LAYO resource, which causes icons to snap to invisible grid points on the desktop when they are created or moved, keeping them from piling up in the usual haphazard way.

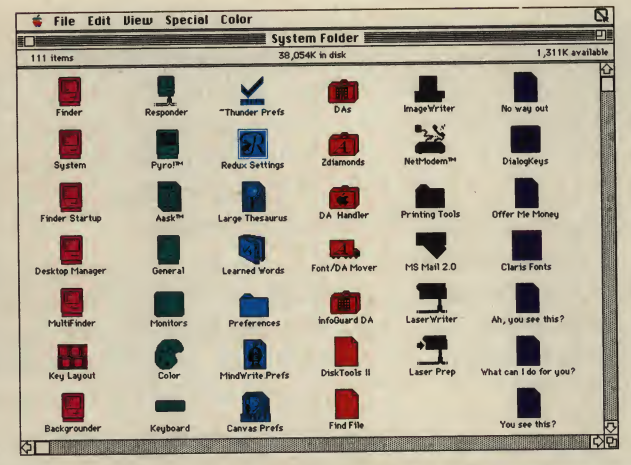


Figure 2: Layout, a free resource-editing tool, lets you adjust the Finder's layout of icons, the size and style of type, and the color of folders and files. However, you are limited to editing only certain resources. For instance, you can't change the names of items in the Finder's menus, but you can adjust the color and layout of icons. The top half of the figure shows a vibrant color scheme chosen so that the colors are differentiated even when you work in gray-scale mode (as shown in the bottom half).

A common myth among many Mac users is that you can't and shouldn't modify the System or Finder. Truth is, you can — and probably should — tweak these files to make them suit your needs.

Using Layout. Layout doesn't run under MultiFinder, so you need to turn MultiFinder off before you start. When you double-click on the Layout icon, you'll see a window with document icons arranged in neat rows and columns. Choose Max Windows from the Options menu and select a value lower than 13. (The default is 13, so if you see another value, it means your Finder has already been modified.) Choose Always Grid Drags from the same menu (Always Grid Drags should now have a check mark next to it). Choose Quit from the File menu, answering Yes to the query about saving your changes.

Using ResEdit. When you double-click on the ResEdit icon, you'll see a file dialog box. Choose the System Folder and then the Finder, and you'll see a window listing all the resource types in the Finder. Clicking on LAYO brings up a second window with LAYO 128, the only LAYO resource. Clicking on LAYO 128 brings up the scrolling window for the resource. Scroll

A Small Puzzler

Just how small is the standard Macintosh screen?

Assuming screen dimensions of 512 pixels horizontally by 322 vertically (the area below the menu bar on a Plus or SE), given that an icon is 32 x 32 pixels, and allowing 70 pixels horizontally by 20 vertically for each icon's name (which is big enough to name everything "Bill Atkinson," using a 9-point monospace font, and to reserve some space below the text), how many nonoverlapping icons can you place on the screen? That's icons, not small icons.

The solution, which requires some exploration with ResEdit or Layout, will appear next month. As usual, there will be a T-shirt for the first solver, and as usual, I will be the sole judge.

Congratulations to Kevin Garrett of Woodland Hills, California, for his solution to September's puzzle. The trick was to use ResEdit or Layout to set the Title Click bit in the LAYO resource in the Finder.



Send your solution to

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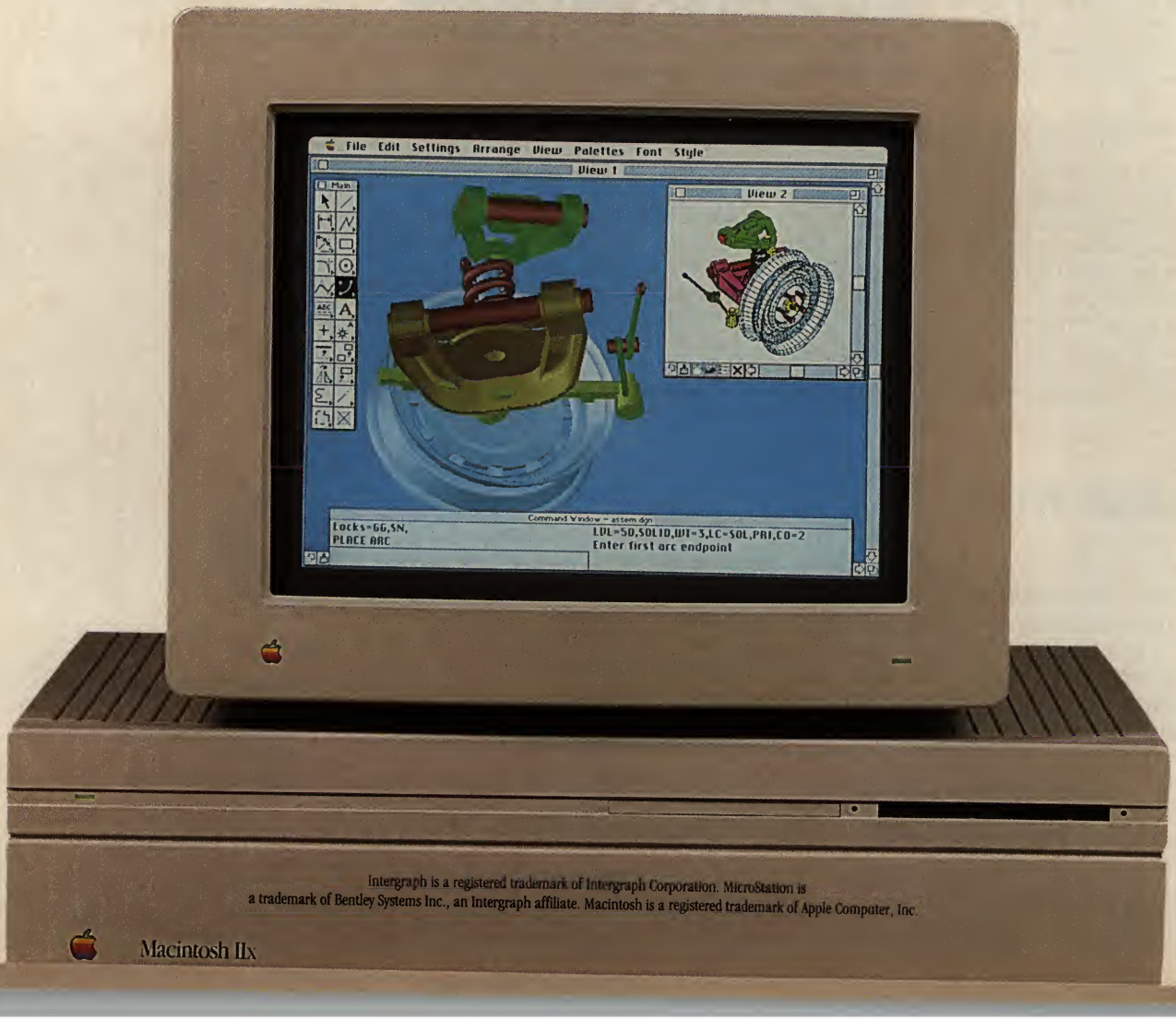
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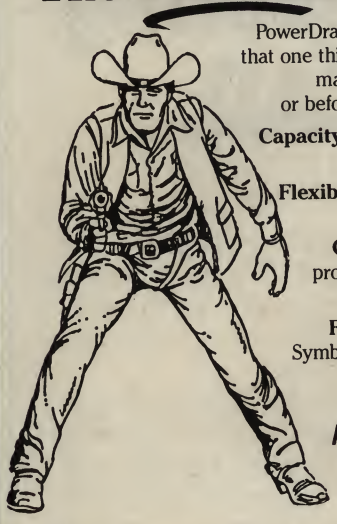
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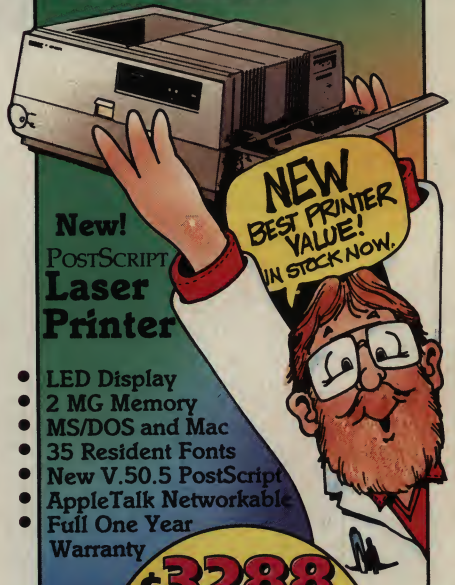
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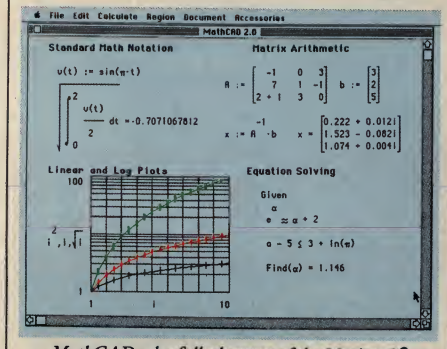
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down that window to the bottom, where you'll see "Max #" (of windows). Type in the number of windows you want. Scroll back up to Always Grid Drags, and click the radio button next to the numeral 1 (1 for on, 0 for off). Choose Quit from the File menu, answering Yes to the query about saving your changes.

Try out the changes. The increased memory won't be easy to see unless you're in a situation where this trick is your only hope for squeezing out a few more bytes. But you can easily see the effect of the icon-alignment modification by dragging any icon across the desktop; it should snap to a grid location when you release it.

You can now go back and see what other options LAYO 128 has. One LAYO option, Title Click, is the key to the solution of September's puzzle: It lets you bring up a window that you can't reach on the desktop.

Vivid Color Icons

If you have a color Mac, you can change the way colors are used with icons and change the colors displayed on the Color menu.

Using Layout. Open Layout and select Color Style from the Options menu. This will bring up two radio buttons labeled Normal Color Style and Alternate Color Style. Click on the latter for more-vivid icons. You'll also see eight color bars like the bars on the Finder's Color menu. Click on any color and use the Color Picker to change its value. Quit, saving your changes (you can reestablish the old colors later by choosing the default).

Using ResEdit. Open the Finder with ResEdit as above, and open the LAYO 128 resource. Scroll to the bottom of the window, and change Color Style from 0 to 1. Then close the LAYO resource and open the Finder's clut (color lookup table) resource. You'll see eight sets of boxes labeled "Part code 0" through "Part code 7," each holding a hexadecimal number for a color. These boxes set the red, green, and blue components of the eight Color menu colors, with Part code 0 referring to the bottom color in the menu and Part code 7 referring to the top color. Here are the values I use for my system:

Part code	Red	Green	Blue
0	$FFFF	$FFFF	$FFFF
1	$2000	$2000	$1000
2	$0000	$1000	$FFFF
3	$FFFF	$0000	$0000
4	$FFFF	$0000	$FFFF
5	$0000	$FFFF	$3000
6	$0000	$FFFF	$FFFF
7	$FFFF	$FFFF	$0000

If you bother to type in these numbers, you'll understand the chief failing of ResEdit: Too often it expects you to type numbers when it should be offering you choices. You'll have a more useful set of colors, however.

Before changing any of these color codes, though, you should note the original numbers in your System. Better, experiment only on a copy of your System; trying out codes other than the default or those I've suggested may yield results you don't like.

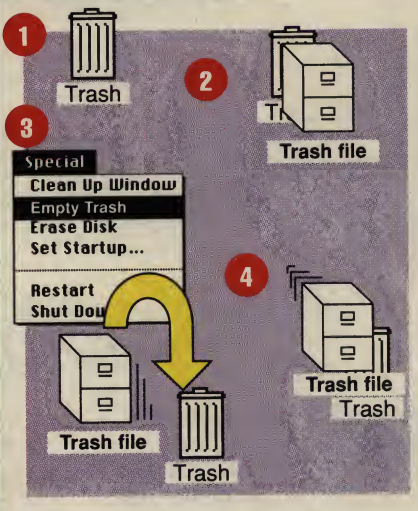
The point of this example is not only to let you select more-pleasing desktop colors but also to let you use color more effectively. You may be color-coding your icons (for example, color might code importance or permanence of files, with one color for System files, another color for more transient applications and documents, and another for files that should definitely be removed from the hard disk as soon as possible). If so, your color coding is likely to disappear if you need to turn off color for any reason because the colors Apple supplies are not distinctive under gray scale.

But your colors can be. Turn off color with the Control Panel (you can do so while using either ResEdit or Layout), and adjust the colors to be distinctive and memorable even when there is no color. If you follow the example above, you'll see a blinding display of colors. And if you turn off color, you can distinguish among the shades of gray.

One way to make color assignments memorable is to make colors darker (or lighter) as you go down the Color menu list, assigning colors higher on the list with a meaning that is higher on some dimension. The color at the top of the Color menu might be assigned to System files, for example, and colors lower on the menu could be assigned to progressively less important or less permanent files.

That's enough Finder-modifying — we'll dig deeper into the Finder and other System files in the future.

Finder Functionality



Layout can whet your appetite for modifying the Finder further, but it can't provide you with new ways to modify it. This is where ResEdit enters the picture. You can use ResEdit to edit the icons that the Finder displays for folders and generic files, for example. This may seem utterly frivolous, but it does suggest a solution to last month's puzzle.

That puzzle asked you to simulate, by means of a personal macro, the effect of Apple's trash can as it will reportedly be implemented in System 7.0: Files deposited in the trash should stay there until explicitly discarded.

My solution is to put a folder named Trash in front of the trash-can icon and record an Empty Trash macro that moves the folder off the trash can, grabs its contents, moves the contents into the real trash can, empties that, and puts the Trash folder back.

One problem with this solution is that a horizontal folder icon doesn't completely cover the vertical trash-can icon. But since icons are resources, they are editable. My modified folder icons look like file cabinets and have a vertical format, which nicely covers the can.

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Modem Speak

Demystifying the Hayes command set



Calling someone by modem can be as easy as pulling down a menu or clicking on a button, bypassing the arcana of modem commands. But this also bypasses much of the power of your modem, power that is built in to the Hayes command set.

A de facto industry standard, Hayes commands work with most modems billed as "Hayes compatible," but the idea of Hayes compatibility is something of an industrywide misconception. Various modem manufacturers implement some of the Hayes commands correctly, alter some, and omit others. Even Hayes uses different command sets for different generations of its own Smartmodems, and the results of specific commands differ among the different models.

Two things are certain in modem language: the beginning and the end of a command string. All commands except Escape (+++) and Again (A/) must begin with the prefix AT and end with a carriage return. AT stands for *attention*. You can type it either in uppercase (AT) or in lowercase (at), but don't type At or aT. Follow this with the desired commands — you can enter up to 58 characters — and end by pressing the Return key. You can separate commands with spaces for legibility.

The "Common Hayes Commands" guide contains the most common and useful of the Hayes commands for 2,400-bps modems. Some of the most common deviations from Hayes compatibility are noted in the table; consult your modem manual to clarify how your modem interprets these commands.

By Kristi Coale

Common Hayes Commands

General commands

A/ Again command

Requiring no AT prefix and no Return, this command causes the modem to repeat the previous command string. Its most common use is for redialing after a busy signal or unsuccessful connection attempt.

+++ Escape (interruption) command

The Escape command, which doesn't require AT or a Return, takes the modem off-line and returns it to the Command mode. At this point, you can issue any command, such as one to hang up or change operating parameters. Wait a few seconds after typing other characters before typing +++.

A Answer command

The Answer command tells the modem to answer the phone on an incoming call (manual answering).

S0 Auto-Answer command

You can set the number of times (up to 255) the phone will ring before the modem automatically picks up the line. Type S0 followed by = and any number from 1 to 255. Setting S0 = 0 tells your modem not to answer the phone automatically. A sample string might look like this: ATS0=5. Auto-Answer is one of several commands that assign values to the modem's S-registers. S-registers are memory locations whose values affect modem operations. See the following additional discussion and in the "Dial S for Register" guide.

H Hook (hang up) command

H can hang up a call and switch the phone line from data to voice communication when a phone is also connected to the line. H disconnects your modem from the line. Once the other party does the same, voice communication can begin. If you're in Data mode, you must issue the Escape command before the Hook command. To switch back to modem communication, one party must issue the Dial command (ATD) with no phone number; the other must issue ATA. Once you see the result code, both can hang up the phone and resume data communication. H or H0 hangs up the modem from the phone line; H1 takes the phone off the hook.

O Data (on-line) mode

You are in Data mode once you've started data communication. If you want to issue a modem command, you have to leave Data mode by typing the Escape command. To return from Command mode to Data mode, use the O command.

D Dial command

ATD puts the modem into Originate mode; it will then dial the dialing string that follows. This string can contain any of the following Dial modifiers.

Dial modifiers

0–9, *, #, ABCD
Digits, characters for dialing

The asterisk (*), pound sign (#), and characters ABCD (for phones with these extra keys) can be included in your dialing string only if you're using touch-tone dialing. For readability, you can insert parentheses, hyphens, spaces, and other characters in a dialing string — the modem ignores them.

P Pulse Dial command

Issuing the Pulse command after ATD tells the modem to use pulse dialing. You cannot use extra characters such as the asterisk or pound sign with this mode.

T Touch-Tone Dial command

Issuing the Tone command after ATD instructs the modem to use touch-tone dialing instead of pulse dialing.

; (semicolon)
Return to Command Mode after Dialing command

Placing a semicolon at the end of a dialing string tells the modem to remain in Command mode after dialing a number. This can, for example, let you listen to a recorded message over the modem's speaker without picking up the phone. Or, if you want to use your modem to dial a person, end the dialing string with ;H, which will disconnect the modem altogether, leaving you with only voice communication. In summary: ATDT *number* puts the modem into Data mode for dialing another computer. ATDT *number;* dials and leaves the modem off-line in Command mode. ATDT *number;* H hangs up the modem after dialing.

, (comma)
Pause before Dialing String command

If you need a delay between dialing digits in a phone number — as with calls through a PBX (private-branch exchange) or CBX (central-branch exchange) office telephone system where you dial 9 and wait for connection to an outside line — use a comma. The modem waits two seconds before dialing the rest of a number. You can change the pause length by resetting the S8 register.

@ (at)
Wait for Silence command

Some phones don't have a dial tone; they use a "quiet answer." This command instructs the modem to wait for 5 seconds of silence. If the modem doesn't detect this silence within 30 seconds, then you'll get a NO DIALTONE result code.

! (exclamation point)
Hookflash

The modem will hang up for half a second and then reconnect. This command is useful on office PBX lines for call transfer.

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W Wait for Dial Tone command
This command instructs the modem to wait for a dial tone before dialing a number.

R Reverse Mode command
Helpful for reaching "originate only" modems that can't receive calls, this command puts your modem in Answer mode so that the modem you are dialing can operate in Originate mode. Just enter R after the telephone number.

Interface adjustments

E Local Echo command
Echo on (E1, the default setting) lets you see what you're typing on-screen when in Command mode. E0 turns off the echo.

F Full Duplex command
Similar to the Echo commands, F lets you select full duplex (F1, the default) or half duplex (F0) when the modem is in Data mode. Full duplex means no local echoing, so you won't see what you're typing unless the other party is echoing back — most systems are set up to do this. Half duplex gives you local echo in Data mode — if the other computer is also echoing, then each character you type will appear on-screen twice (eecchhoo).

L Speaker Level command
This command sets the speaker's volume — L2 (medium) is the default setting. L0 and L1 are lower volumes, and L3 is high volume. Many modems have manual speaker dials.

M Monitor Speaker command
This command turns the modem's speaker on or off, letting you listen to dial tones, busy signals, and voices without picking up the telephone receiver (you can't use it to talk back — it's just a speaker).

M0 turns off the speaker. M1 turns the speaker on for Command mode and off for Data mode. M2 leaves the speaker on in Command and Data modes so you can hear what is happening along the line. M3 leaves the speaker on after dialing, until a connection is made. M0 and M1 are the most common settings.

&F Retrieve Factory Configuration command
&F clears out the modem's operating parameters and replaces them with the factory configuration stored in ROM.

&W Write User Profile to Memory command
Most modem parameters, such as echoing, can be stored in the modem's nonvolatile memory. You can save two complete sets of operating parameters as "user profiles" 0 or 1 by typing either &W0 or &W1. When you power-on the modem, it normally sets all parameters to profile 0. *Warning:* The behavior of the &W and the Z commands varies widely among "Hayes compatible" modems — check your manual.

Z Reset (zap) command
This command resets all modem parameters to stored user profile 0 or 1; type Z0 or Z1. (Z alone equals Z0.) Wait a few seconds before entering another command while the modem resets. Use this command by itself or at the end of a string. *Warning:* Not all modems support user profiles — the Z command typically resets those that don't to their factory configurations.

&V View Active Configuration command
&V displays the active configuration, user profiles 0 and 1, and any stored telephone numbers. Don't issue this command on the same line as other commands.

&Y Designate Default User Profile command
Usage is &Y0 or &Y1. This command determines which user profile is to be loaded automatically when you power-on the modem. The default is 0.

Sr=n Set S-Register Value command
The number of the S-register you wish to change is *r*, and *n* is the new value to be stored. This command is most commonly used with auto-answer register 0, but you may want to change the value (*n*) of other S-registers as well. See the "Dial S for Register" guide.

Sr? Display S-Register Value command
If you want to know the value of an S-register (*r*), call it up with this command.

Sr Set Default S-Register command
If you want to access one S-register (*r*) repeatedly, use this command to make it the "default" register. You can then read this register with AT? and change it with AT=n.

&Zn=x Store a Telephone Number command
The modem can store up to four dialing strings in its nonvolatile memory, and each can have up to 36 characters. The memory location you want to use, *n*, must be a number between 0 and 3. The dialing string is *x*. A sample string might look like this: AT&Z2=9,800,321-9876.

S=n Dial a Stored Number command
Use this command to dial a number you have previously stored with the &Z command. The variable *n* is the memory address and can range from 0 to 3. A dialing string might look like this: ATDTS=2.

Q Result-Code Display command
Result codes (messages such as OK or CONNECT — see the "Dialing for Results" guide) keep you up-to-date with events along the data line, but you may wish to get rid of them. Q0 enables result codes (default); Q1 turns them off.

V Result-Code Form command
You can change the format of the result codes that the modem displays on-screen to indicate the progress of a command. V0 displays results numerically; V1, the default setting, displays them in verbose (English) form. Most telecommunications programs expect that your modem is set to Q0V1.

X Result Code Setting and Dialing Capabilities command
This command selects which result codes the modem can display and sets some dialing capabilities: X0 selects the basic set of result codes (0–4). X1 selects result codes 0–5 and 10. X2 selects 0–6 and 10, and detects a dial tone. X3 selects 0–5, 7, and 10, and detects a busy signal. X4 selects default setting, 0–7 and 10, and detects a dial tone and busy signal.

B Balance command
For non-Bell–specification PBX or CBX lines, this command keeps the transmitter level at –10 decibel milliwatts (dBm). The default setting is B0. B1 makes the modem compensate for nonstandard lines by reducing the transmit level by 3 dB. Try using this command if you have trouble getting your modem to work with your phone line.

Y Long-Space Disconnect command
Turns the modem's response to a long-space disconnect on and off. Y1 tells the modem to hang up if it receives a long-space–disconnect signal from the remote modem. Y0, the default, disables the modem's response to long-space disconnect.

Dialing for Results

Once you enter a modem command, you wait for a response. The messages you see on-screen are result codes. This guide lists the result codes common to most modems, particularly 2,400-bps modems. See the "Common Hayes Commands" guide for more on the Q, V, and X commands, which control result-code displays.

0 OK
Command executed.

1 CONNECT
Connection achieved at 300 bps.

2 RING
Ring signal detected (your phone is ringing).

3 NO CARRIER
Connection broken; carrier signal not detected.

4 ERROR
Error in command syntax or command line is too long.

5 CONNECT 1200
Connection at 1,200 bps.

6 NO DIALTONE
No dial tone detected at the other end.

7 BUSY
Busy signal detected at the other end.

8 NO ANSWER
No silent answer detected for system not providing a dial tone.

9 CONNECT 2400
Connection at 2,400 bps.

Red-Light District

What do those flashing lights on your modem stand for? The eight indicator lights, positioned from left to right, give you a general report on your modem's operations.

HS High Speed
Generally, you see this light when the modem is operating at its maximum speed (2,400 bps for most modems).

AA Auto-Answer
In Auto-Answer mode, this light blinks on and off for every ring until the modem answers.

CD Carrier Detect
This light comes on at the time of connection with another modem and stays on until the carrier signal is lost.

OH Off Hook
This light comes on when the modem/phone is using the line, as when dialing a number.

RD Receive Data
This light comes on while your modem is receiving remote data and sending it to your Mac.

SD Send Data
You see this light whenever you send data or commands to your modem.

TR Terminal Ready
This light indicates that your Mac is ready to send or receive data.

MR/EC Modem Ready/ Error Correction
This light indicates that the modem is on; it flashes when the modem is testing itself.

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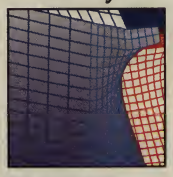
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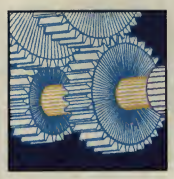
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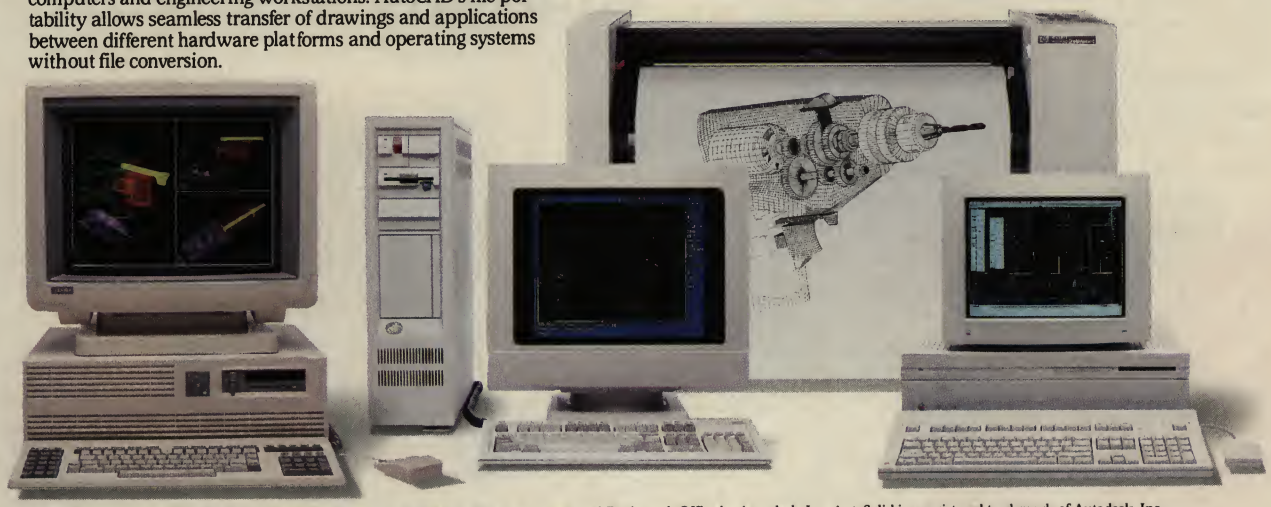
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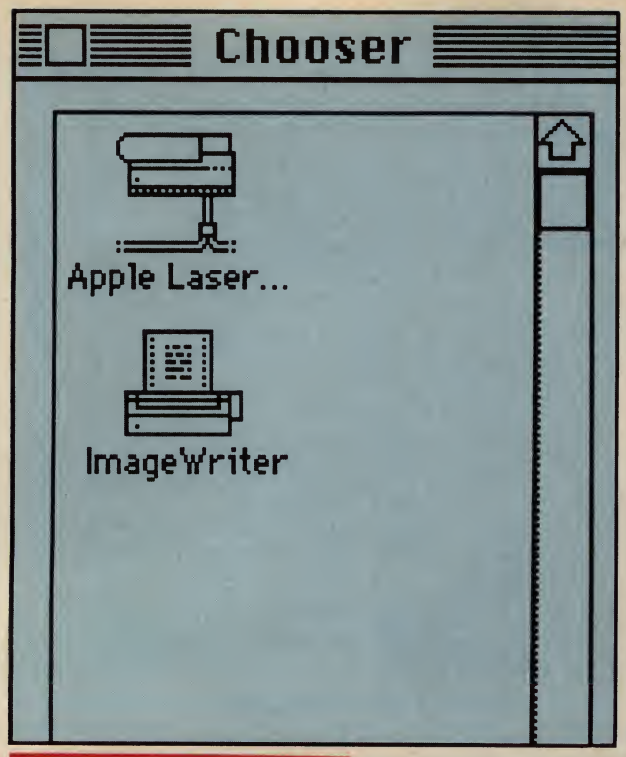
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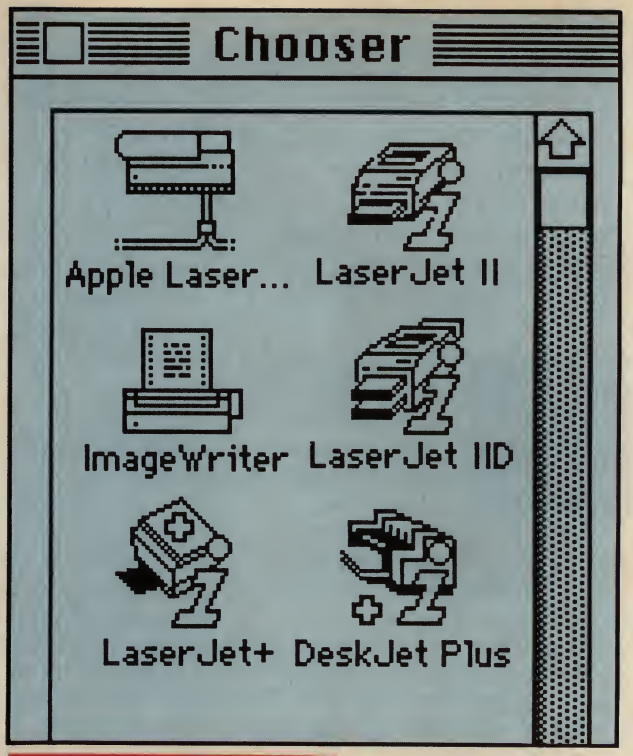
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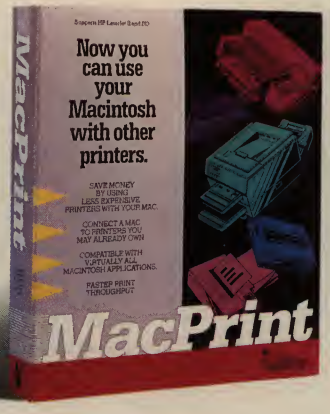
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HARD WARE

Dial S for Register

The command Sr=n (see the "Common Hayes Commands" guide) lets you set values for any of your modem's S-registers. It is most commonly used to set S0, the auto-answer register, but you may wish to change the values of some other registers as well. Here is a brief explanation of the more commonly used registers.

S0 Auto-answer
S0 is the number of times the phone is to ring before the modem answers. You can set S0 to any number of rings from 0 through 255. Setting S0 = 0 disables auto-answer.

S1 Ring counter
S1 keeps track of the number of times the phone has rung, up to 255.

S2 Escape character
S2 holds the ASCII code for the character used in the Escape command. It is initially set to 43, the code for a plus sign (+).

S3 Carriage-return character
S3 holds the ASCII code for the carriage-return character. It is initially set to 13.

S4 Line-feed character
S4 holds the ASCII code for the line-feed character, initially 10.

S5 Backspace character
S5 holds the ASCII code for the backspace character, initially 8. You can set it to any nonprinting-character code — values from 0 through 32, and 127.

S6 Initial wait
S6 is the time the modem waits after it picks up the phone, before it starts dialing. Initially it's set to 2 seconds, but you can set the wait for 2 to 255 seconds.

S7 Carrier wait
S7 is the length of time your modem waits after dialing to detect a carrier; the default time is 30 seconds. S7 can be set from 1 to 255 seconds.

S8 Pause time
S8 is the number of seconds' delay caused by inserting a comma into a dialing string. You can set it to any number from 0 to 255.

S9 Carrier-detect response time
S9 measures, in tenths of a second, how long a carrier signal must be present before the modem recognizes it. You can set it to any value from 1 to 255, for a range of .1 to 25.5 seconds.

S10 Disconnect timing
S10 measures, in tenths of a second, the length of time for which a carrier signal can be interrupted before the modem hangs up. It can be set from 1 to 254 (.1 to 25.4 seconds); entering 255 causes the modem to assume a signal is always present. The value in S10 must be larger than that in S9; otherwise S10 will disconnect before S9 recognizes a carrier.

Telecommunications Glossary

American Standard Code for Information Interchange (ASCII) is a widely used binary-coding scheme for alphanumeric characters, developed to establish compatibility among data services.

Baud and bits per second (bps) are frequently (and carelessly) used interchangeably. *Baud rate* refers to the number of electrical values (or electrical-state changes) sent each second on a communications line; *bits per second* refers to the rate of data transfer. In a binary system (in which only two values — 1 and 0 — are used to code all symbols), 1 baud is equal to 1 bit per second.

Long-space disconnect is a four-second continuous break signal sent by the local modem before it disconnects from the remote modem and after it receives a disconnect signal from the remote modem.

Registers are numbered locations in a modem's memory, used to store operating parameters, timing values, counters, and other such information.

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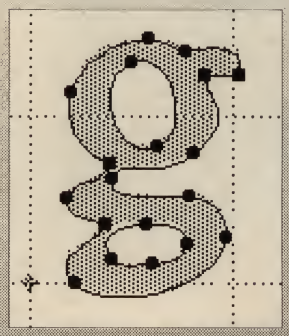
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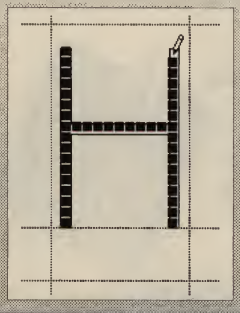
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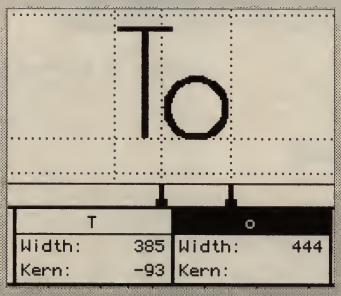
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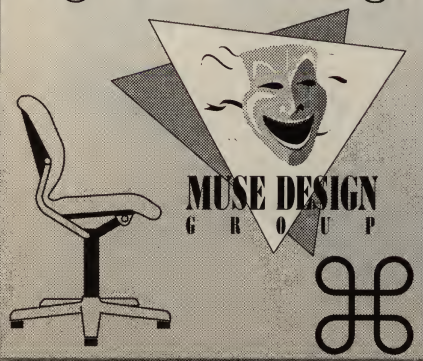
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Foreign Languages

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TIP SHEET

Tip Sheet

Readers Share Their Tips and Tricks

Word 4.0

Microsoft doesn't mention kerning anywhere in the Word manuals, but you *can* do rudimentary kerning with the formula command Displace, which lets you offset any character by whole points. Note the differences in the examples in Figure 1.

To kern two characters:

1. Choose Show ¶ from the Edit menu.
2. Place the cursor between the two characters you want to kern.
3. Press Option-Command-backslash (\), and then type the letter D (the formula code for Displace).
4. Press Option-Command-backslash again, and then type the letters BA (the formula code for Backward).
5. Enter the number of points to kern (in whole points).
6. Follow this with both open and close parentheses () to end the formula.

The code you see on-screen should look like this: `\d\ba3()` (using 3 points as an example).

7. Choose Show ¶ again or print your text, to see the difference in spacing.

If you save this formula as a Glossary item, you'll have to enter it only once.

Andy Burns
Los Angeles, CA

Tip of the Month

AWAY
AWAY

Today
Today

Figure 1: Kerning lets you tidy up spacing between two characters. Microsoft Word supports a crude form of kerning with the formula command Displace. You can reduce the space between two characters by any number of points.

Word 4.0

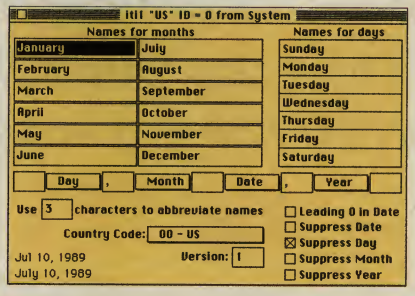


Figure 2: Many programs allow you to suppress the day tag (Monday, Tuesday, and so on) of a date when you insert it into a document, but Word 4.0 does not. A little juggling with ResEdit and the itl1 System resource can do the trick, though.

Word lets you insert the date into documents through its Commands dialog box, but you're stuck with its date formats, which include the day of the week (except for the short format — for example, 3/31/89). If you want a date such as March 31, 1989, you'll have to suppress the weekday in the System file with ResEdit 1.2. (Try this on a copy of your System file before you change your working System file.)

1. Open the System file and scroll down to itl1.
2. Open itl1. Select itl1 "US" ID=0 and open it.
3. Next, click on the Suppress Day box (see Figure 2).
4. Close ResEdit and save the changes.

Open a Word document. To get the date, make sure you're using Full Menus and select Glossary from the Edit menu. You'll see the following date entries: date - now - abbreviated, date - now - long, and date - now - short.

Select either the long or the abbreviated format and click on Insert. The date will appear either as March 31, 1989, or as Mar. 31, 1989, respectively.

Gerald H. Raddtz
Oakland, CA

MacroMaker

If you catch yourself making typos such as typing *teh* for *the*, you're not alone — transposing letters is one of the most common typing mistakes. Here's a macro that fixes transposed letters with one keystroke. I use it with MacroMaker and Word, but you can use the same general procedure with AutoMac III, MindWrite, or other combinations of word processors (that support the arrow keys) and macro programs. [*For more on MacroMaker and using macros, see "Macros Make Mightier Macs," October '89 — Ed.*]

1. If you don't already have MacroMaker installed, put a copy of the MacroMaker file, which comes on the Macintosh Utilities Disk 2 in System 6, into your System folder. For MacroMaker to take effect, you have to restart your Mac.
2. Place the cursor immediately after any two transposed letters in your word-processing

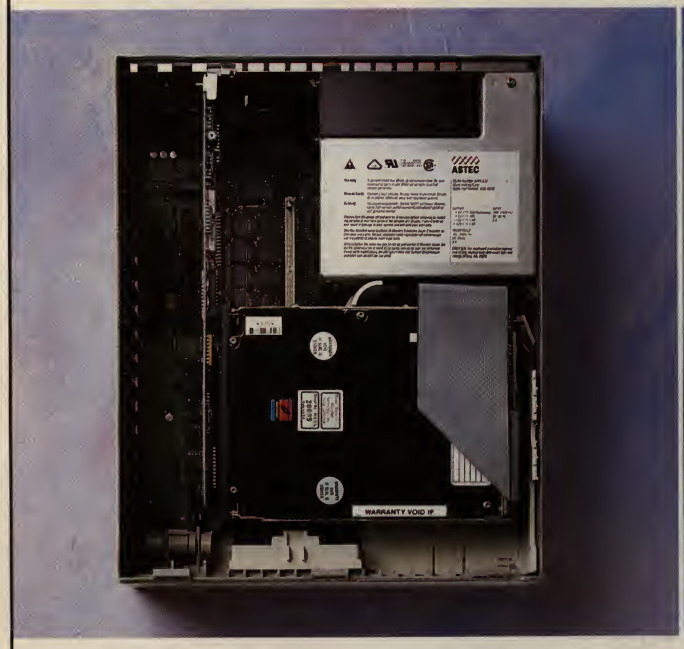
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TIP SHEET

document (if you've just typed them, this is where the cursor will be anyway).

3. From the MacroMaker menu, select Start Recording.

4. Press Shift-left arrow to highlight the second of the two letters to be swapped (don't use the mouse to highlight the letter, or the macro will operate only on this position of the screen).

5. Cut this letter (with Command-X).

6. Press the left arrow to move the cursor to the left of the first letter (again, do not use the mouse).

7. Paste (Command-V) the second letter on the left side of the first letter.

8. Press the right arrow to return the cursor to its original position following both letters.

9. Immediately select Stop Recording from the MacroMaker menu.

10. Give the macro a name, such as Swap Letters or Transpose, and assign it a keystroke.

11. Store the macro.

To use the macro, make sure the cursor is positioned immediately after the transposed letters and use the keystroke you assigned in step 10.

Thomas De Rivera
Los Angeles, CA

Ready,Set,Go! 4.5

Occasionally you may need to import a text file into Ready,Set,Go! 4.5 that displays unwanted or unknown characters on-screen. Files transferred from other computers or downloaded from bulletin boards often contain such characters. Non-Macintosh operating systems frequently use line feeds in addition to or instead of carriage returns. These unwanted characters generally appear on the Mac as little boxes.

You can get rid of these characters by using the Replace command. Select the offending box or other symbol by highlighting it. When you select Replace, the character is automatically pasted into the Find box in the dialog box. Move the cursor to the Change To box and press Option-D and then R (this specifies that you want the replacement character to be a carriage return; alternatively, you can replace the nonprinting characters with ordinary spaces or with nothing at all). Click on OK. All the symbols are replaced by carriage returns (see Figures 3a and 3b).

Michael Conley
San Diego, CA

FDHD

The high-density disks for Apple's new FDHD drive can cause problems when you're dealing with earlier Macs. Let's say you want to copy a file from an SE, Plus, or II and bring it home to your SE/30 or IIcx, but all you have on you is a high-density disk.

The standard Apple drive can format and write onto a high-density disk as if it were a regular double-sided, double-density 800K floppy, but when you insert that disk into an FDHD drive, it warns you, "This disk is not formatted for use in this drive." The FDHD doesn't like a high-density disk formatted as an 800K disk because the extra square hole on the top left corner of the high-density disk tells the FDHD drive to read it as a high-density disk.

To get around this, simply cover up the square hole with a piece of tape. Then the FDHD thinks it has a standard 800K floppy and will read it.

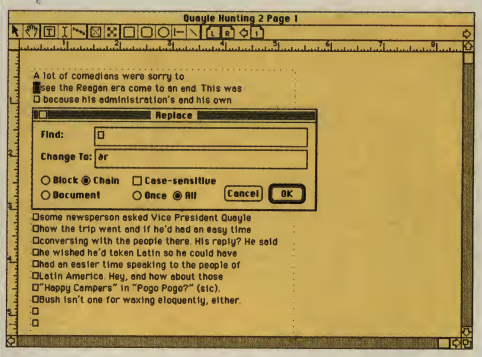
Scott Jones
El Cerrito, CA

Wingz

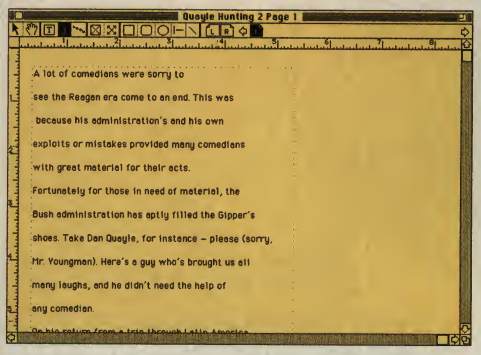
Wingz offers users great control over which elements of a spreadsheet to show and print. The problem, however, is that you must hide or show each element separately, which means

Ready,Set,Go! 4.5

3a



3b



Figures 3a and 3b: Imported text files may have unwanted characters that appear as small boxes (Figure 3a); line-feed characters are common in files imported from non-Macintosh computers. You can turn line feeds into carriage returns (indicated by ∂r in Figure 3a) or get rid of strange characters by using Ready,Set,Go!'s Replace function.



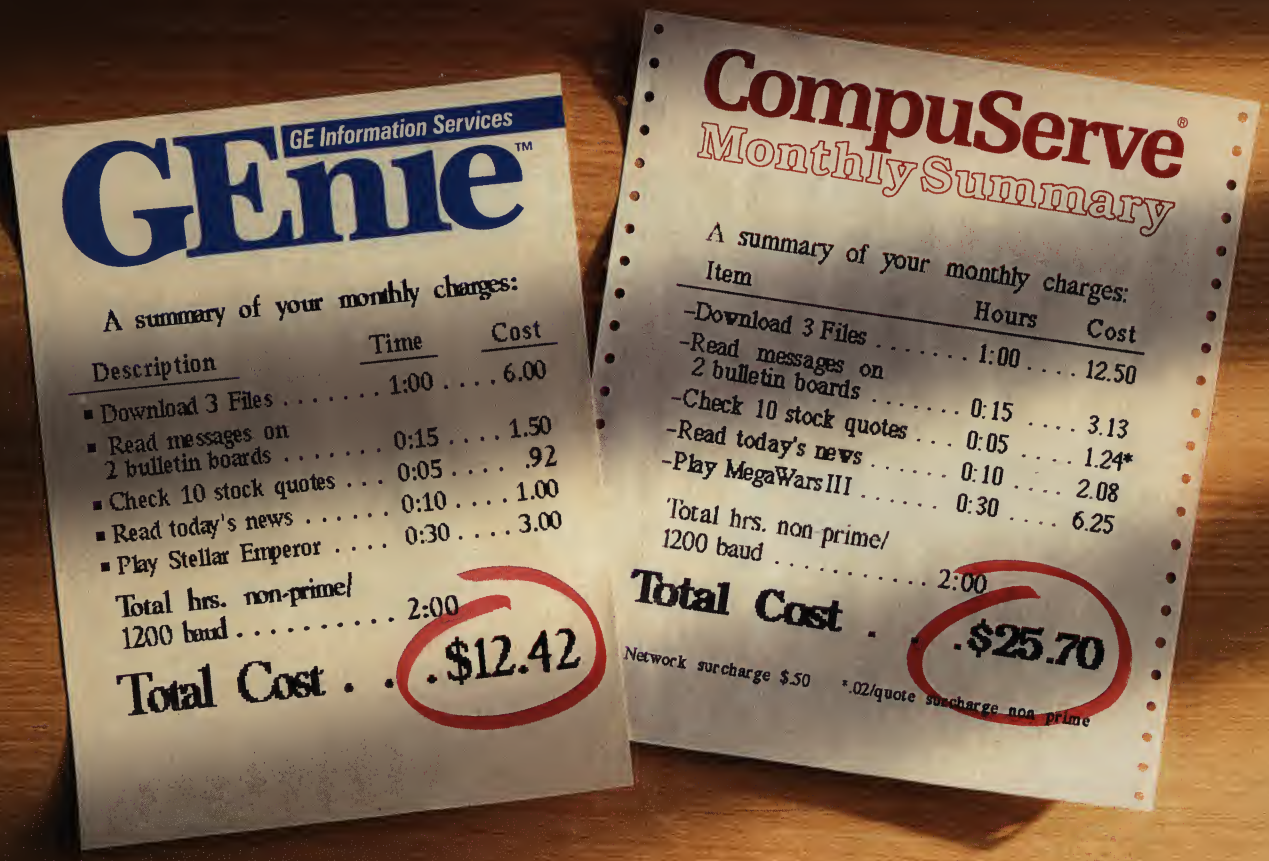
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TIP SHEET

you must take numerous trips to the Window menu and the Show submenu. These trips can be a nuisance when all you want to look at and print is one graph.

By using HyperScript, you can easily add Hide and Show commands to the Sheet menu. First, select New Script from the Script menu, and then type the script shown in Figure 4a into the empty window that appears (the indents are for legibility — they're not necessary).

The Repaint Off command in this script stops Wingz from redrawing the screen after hiding each element (which would slow down the script). The No Line Border command hides the border that Wingz normally draws around every printed sheet. Figures 4b and 4c show a worksheet before and after the new Hide command has been chosen.

Lawrence C. Stedman
Fairfax, VA

Arkanoid

If you're tired of relying on chance for the right power capsule to drop down, here's a way to better your odds — and even make yourself a sure winner:

1. Boot up Arkanoid and begin to play as you normally would.
2. Type dsimagic.
3. Resume play. You should see a capsule called DS drifting down the screen.
4. Catch it and press A to regain sound.
5. Press the following keys to obtain the power capsule you want:

B = break to next round
C = catch
L = laser
P = player (extra life)
S = slow

When you press B on some earlier versions, you see a screen called Boss Coming instead of the next level.

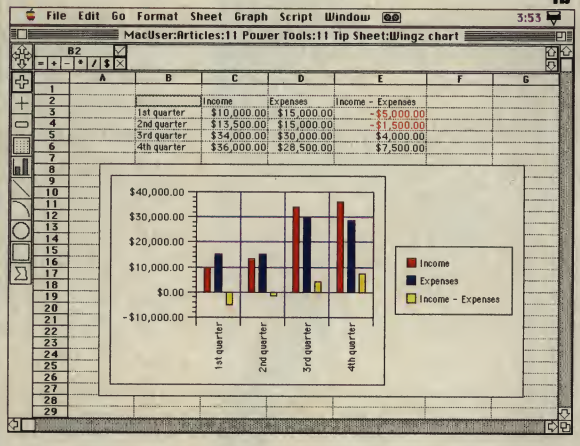
Hiraku Shimoda
Nesconset, NY

Wingz

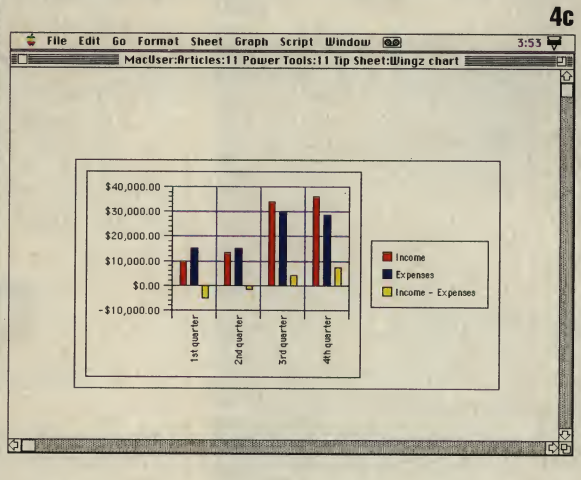
4a

```
select menu "sheet"
add menu separator
add menuitem "Hide" command
        "repaint off
                hide sheet hide tool box hide entry bar
                select report border no line border
        repaint on
        repaint window"
add menuitem "Show" command
        "repaint off
                show sheet show tool box show entry bar
                select report border single line border
        repaint on
        repaint window"
```

4b



4c



Figures 4a, 4b, and 4c: Wingz offers some powerful menu-customization routines through its HyperScript language. A custom Hide command instantly hides all of the spreadsheet except for graphic elements, making it easy to print the chart only.



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Help Folder

Answers to Readers' Questions

PostScript and Hard-Disk Drives

Q. Is there a way to read a PostScript font that has been downloaded to a LaserWriter or the PostScript code of a resident font from a Macintosh? Is it possible to save the font to my hard-disk drive? And when an application is sending PostScript code to a LaserWriter, is it possible to print only the PostScript code without its being interpreted by the PostScript engine, so that I can see what's going to the LaserWriter?

J. H. Choi
Lansing, MI

A. A no and two yeses. PostScript fonts are stored as mathematical outlines, and certain fonts have encoded hints that help them look good at small sizes. In addition, Adobe fonts are encrypted, so there is no way to recall the font information from the printer once it's been downloaded. Third-party fonts are sometimes supplied with a readable file containing the font's PostScript description.

The Apple LaserWriter IINTX and some other printers have a built-in SCSI interface port for connecting to an external hard-disk drive. If an external hard-disk drive is connected, the PostScript engine on the printer uses it to store downloaded fonts, so you save the time of repeatedly downloading them. Although the hard disk is a Macintosh SCSI disk drive, you can't get much information from it, because the data is *not* stored in standard Macintosh HFS file format. Furthermore, Adobe fonts are encrypted.

You can, however, capture the PostScript information that goes to the LaserWriter. Typing Command-K while clicking on the OK button in the Print dialog box in any Mac application saves the PostScript output in a text file called PostScript0.

You can open and edit this PostScript file with most word processors and text editors. When you print it, you'll see the uninterpreted PostScript code.

The Game of the Name

Q. When I put a floppy into my Mac SE's internal drive, the disk's icon appears selected on the desktop, but I cannot change its name by typing a new name unless I first select something else and then select the disk again. Is this a bug in the software, or is it there by design?

Tom Gustafson
Silver Bay, MN

A. It's there by design, dating back to Finder 5.0 or so. Apple was receiving complaints from users (especially those with small children) that it was too easy to type over a filename accidentally. The old Finder interpreted any typing (even leaning on the keyboard) as a desire to change the name of the selected icon. That meant that popping in a floppy disk while a book was resting on the keyboard, for example, blew away the disk name.

Now you must explicitly

Stepping Out Slowly

Q. I use the Stepping Out screen extender on my Mac SE. I was initially excited about the idea of having my small Mac screen operate like a full-page display for doing desktop-publishing layouts. When using Stepping Out, all I have to do is glide my mouse to the edge of the screen to have the remainder of the page appear instantly.

Unfortunately, the program makes my computer so slow that I lose the advantage I thought I'd get by using Stepping Out. If I buy a full-page–display system for my Mac, will it operate as slowly as Stepping Out does?

D. Girard
St. Paul, MN



A. No, working with a full-page–display system will be faster than using Stepping Out.

Stepping Out fools QuickDraw into thinking that the Mac's screen is bigger than it is by reserving more system memory for the screen while showing only a portion of it. When you move to the edge of the Stepping Out screen, it has to save some of the screen image back into system memory and make another saved image visible on the screen. This juggling means moving 20K or 30K of information at a time — not a large amount, but if it happens frequently enough, it can produce a noticeable lag.

It also reduces the amount of memory that's available for applications to use. Most applications make up for less system memory by saving more information on-disk. When an application needs to use the disk a lot, it's slower than when it has plenty of RAM to meet its needs. The larger the virtual screen you ask Stepping Out to create, the more pronounced these delays can be.

An external full-page–display card for the SE solves both problems. First, because all of the screen memory is actually visible, nothing needs to be moved. Once a picture is on-screen, it stays put and doesn't have to scroll around, which eliminates the lag you noticed.

Second, all external display cards come with additional screen memory, so you don't need to steal from what the system and applications want and applications can use the disk less and run faster.

By Chris Espinosa



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select the icon in order to replace its name. You don't have to click on another icon first; just click on the disk icon and then begin typing.

Five Megabytes and Still Hungry

Q. I have a Mac II with a 100-megabyte hard-disk drive and 5 megabytes of RAM. My problem is a recurring dialog box that says my Mac doesn't have enough memory to do what I want to do.

I recently converted a logo (about 35K) from FreeHand and put it into the Scrapbook. I restarted my Mac to close all unwanted applications and defragment memory. I then opened FileMaker. When I tried to paste the Scrapbook drawing into FileMaker, the dialog box appeared, saying there was not enough memory to complete the operation.

Checking the Apple menu showed that only FileMaker was open. The Finder said I had 5 megabytes of RAM with 2.9 megabytes free!

This has happened before at times when I didn't think it should. Where has my memory gone?

Roger Bagley
San Jose, CA

A. It's still there. It's your application, not the Macintosh, that's running out of memory under MultiFinder.

Each application needs a minimum amount of memory in order to run. It also has a maximum amount that you can set. You can control the maximum amount to juggle multiple applications to fit into the amount of memory you have.

Each application is restricted to using that maximum amount of memory to hold itself and its working data. The problem here is that you're not allowing FileMaker to use as much memory as the system has available.

Close FileMaker, return to the Finder, select the FileMaker application icon, and then choose Get Info from the File menu. The Application Memory Size box at the bottom of the Get Info dialog box lets you control how much memory the application can use. Increase this memory number by a goodly amount — say 50K or so — and reopen the application.

Some applications, such as versions of Microsoft Excel up to version 2.2, are limited in the maximum amount of memory they can use, so this technique might not work for all applications — but it should clear up the problem you're having with FileMaker.

By the way, you shouldn't have to restart the machine to defragment memory. If all DAs, applications, and background tasks (such as PrintMonitor) are closed, your memory space is likely to be fresh and usable.

LaserJet Sputters

Q. I own a Macintosh Plus with a hard-disk drive. Recently, I acquired a Hewlett-Packard LaserJet Series II printer. Eager to use my Mac with the laser printer, I bought MacPrint, which supposedly allows you to use your printer with the Mac. "Allows" turns out to be an overstatement.

I was quite satisfied with the initial results. After a few rounds of printing, however, I noticed that the printer would not print a document containing more than a certain amount of data.

When I got some font cartridges for the printer (at $400 to $600 each), I thought my problems were over. But as it turns out, the printer doesn't print special characters such as an em dash (—) or an ellipsis (...). I have been taking French since the first grade, and I thought I could impress everybody

Digitized Sounds in HyperCard

Q. I recently received the MacUser HyperDisk from your magazine. It included a sound stack with 30 digitized sounds. I have Cheap Beep installed in my system, and I was wondering if I can copy the sounds over to Cheap Beep so I can play with them there? I'm not much of a HyperCard user and need some help with this.

Matt Murray
Aptos, CA

A. HyperCard can play any sound that's stored as an snd resource in a HyperCard stack. But there are other common file formats for sounds, and Cheap Beep uses the SoundCap format. Before you can play your HyperCard sounds with Cheap Beep, you must convert them to this format.

The SoundEdit software included with MacRecorder (available for $249 from Farallon, 2201 Dwight Way, Berkeley, CA 94704; [415] 849-2331) can perform this conversion. Of course, MacRecorder does much more than this; it contains hardware (a microphone that plugs into the Macintosh) and software for a complete sound system for the Mac.

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with a laser-printed document in French — but the laser printer doesn't print acute or grave accents, let alone circumflexes.

Time is also a problem. A FreeHand document (a very simple one) takes half an hour to process!

This letter is about as complex a document as I can print on this printer. How can I *really* use my LaserJet Series II printer to its fullest extent?

Adrian Graham
Toronto, Ontario
Canada

A. You *are* using the LaserJet to its fullest extent. You want to use it *beyond* its abilities, which is what's causing the problems. It was designed for text and limited graphics for HP Vectra and MS-DOS machines, because that's all those machines can do.

It's really the Mac you want to use to its fullest extent, and for that you need a printer designed for the Macintosh. One that has all the Macintosh characters in ROM. One that has more than a megabyte of RAM, not 512K, so it can print full pages of graphics. One that has Adobe PostScript running on a separate microprocessor so the Mac doesn't have to spend its time scaling fonts up to 300-dot-per-inch resolution.

MacPrint was designed to give LaserJet owners some access to their printer from the Macintosh, but it won't turn a LaserJet into a LaserWriter.

[*Hewlett-Packard's DeskWriter for the Macintosh is now available for $1,195. The software driver for this QuickDraw ink-jet printer interfaces more cleanly with the Mac. — Ed.*]

A Conspiracy of Fonts

Q. Is this some kind of a conspiracy? Why has no one created a Geneva font to work with my ImageWriter LQ? My computer dealer checked around and found that no such font exists. (He also failed to tell me that I couldn't get top-quality printing with Geneva before I bought my system.) Of the fonts I use with my Mac, I have only Helvetica, Symbol, Times, and Courier LQ. Symbol is useless; Times and Courier look very good on paper, and Helvetica looks fair. But Courier is the only one of the four that's easy to read on-screen and prints well when justified. Geneva appears to be the obvious choice to use on the LQ. It's very readable on the screen, prints fairly well on a plain old ImageWriter, and justifies beautifully. Please let me know whether Geneva is available for my LQ.

Allen Ray Moody
San Angelo, TX

A. There's some good news and some bad news, Allen. The bad news is that nobody — not even Apple — makes the Geneva font in the three- and four-times normal size necessary for use with the ImageWriter LQ, AppleFax Modem, and the LaserWriter II SC. It's not a conspiracy; rather, it's the lack of one. The work of producing a 4x font isn't worthwhile because of the relatively small number of printers that might use it. The good news is that Apple's System version 7.0 will include Apple Outline Fonts, which should provide a wide choice of fonts that look great on all printers and will probably take up less space than your current LQ fonts.

YACCing on the Mac

Q. UNIX has two powerful programs: lex, a lexical parser; and yacc, Yet Another Compiler Compiler. Is there similar Mac software (other than A/UX)? I've heard that "flex" and "bison" (bigger than a yak) are available on the Amiga.

André Ouimet
Nepean, Ontario
Canada

A. The Mac environment has traditionally been weak in the text-oriented tools that are plentiful in the DOS and UNIX worlds. But the Macintosh Programmer's Workshop (MPW) has facilities to handle these "filter" programs that take text into one end, process it, and send it out the other end. One of these programs is MacYACC, a Mac version of the common UNIX tool.

MacYACC generates ANSI C source code for building assemblers, compilers, browsers, page-description/query languages, and language translators. It includes a HyperTalk Toolkit and a PostScript language engine. The Personal ($139) and Professional ($395) versions both include a lex interpreter, which lets you do lexical analysis under MPW. Contact Abraxas Software, 7033 S.W. Macadam Ave., Portland, OR 97219; (503) 244-5253.

Bison, the Free Software Foundation's yacc replacement, has been ported to the Mac as an MPW tool and is distributed by user groups.

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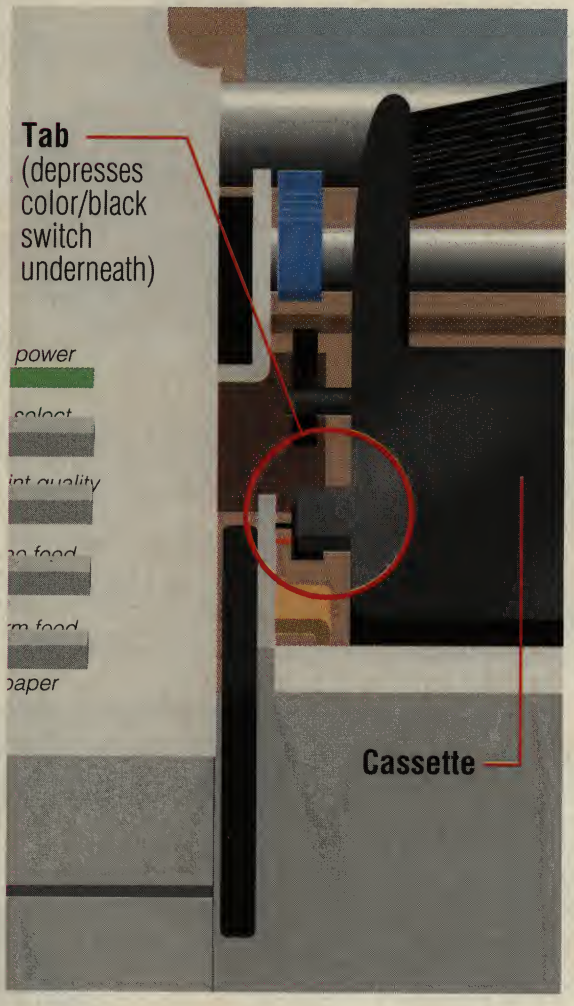
Q. We use an ImageWriter LQ with a black ribbon. Is there an adjustment on the printer that would let us use the full height of the ribbon? Currently, the ribbon is used only in the middle range, and it would seem that it might also be used on either side.

I believe there is a way to program the printer to do this. Can you advise me?

Joan Feinberg
Winter Park, FL

A. First, make sure your ribbon is seated properly. You need to apply fairly strong pressure to the end of the small arms that extend from the ends of the ribbon cartridge — you'll hear a click when the ribbon is seated.

The ImageWriter LQ is designed to cycle through the ribbon in order to use all of it and to minimize wear and tear, but certain printing habits can minimize the usefulness of this feature.



The ImageWriter driver steps to the next of the four "bands" on the ribbon on each successive page of a print job. So on a four-page job, the ribbon is used equally on each band. But because the printer driver resets the printer at the start of every job, each job starts on the top band of the ribbon. If you print mostly one-page jobs, you're going to use the top band of the ribbon most. (Check the October '88 Tip Sheet for directions on inverting the ribbon to give a worn ribbon a new lease on life, and take a look at the April '89 Tip Sheet for more on the switch.)

If you're printing multiple-page documents and you still have the problem, there may possibly be a problem with your printer ribbon.

A small tab on the left side of the black-ribbon cassette depresses a switch in the ribbon carriage. This tiny switch rises up from a small piece of black plastic (which is located just above the ends of two thin wires). The figure below left indicates proper placement of the ribbon cassette. The printer uses this switch to sense whether it has a black ribbon or a color ribbon; it disables the ribbon shift if a color ribbon is present. If your black ribbons aren't depressing the switch far enough, try wrapping cellophane tape around the tab to make sure the sensor switch is depressed.

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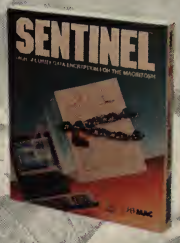
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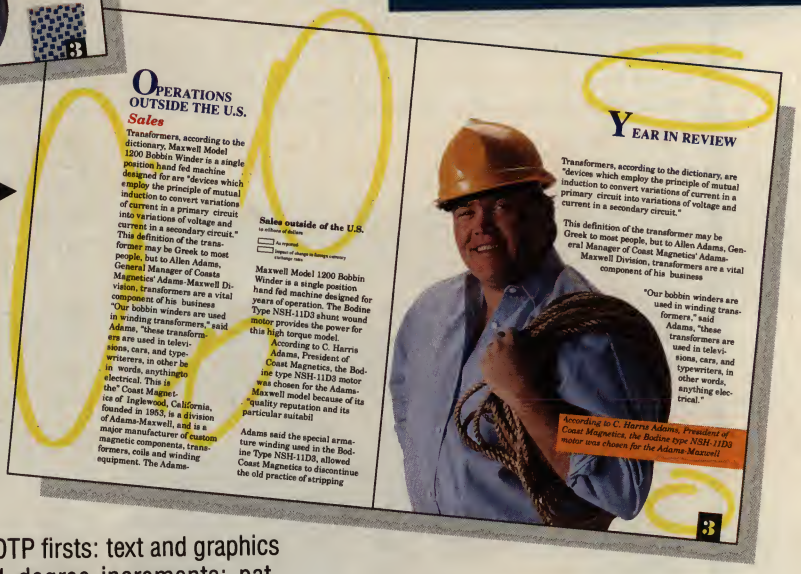
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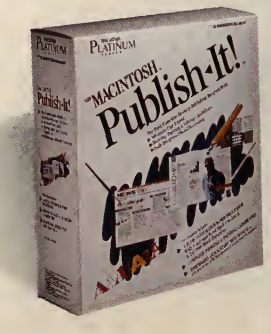
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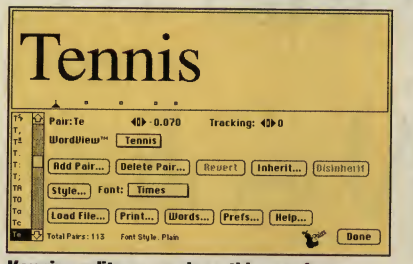
DTP

The Kerning Point

Mac optical character recognition finally comes of age with a new generation of smarter, more powerful software. See "The Well-Read Mac" for a complete report. And sophisticated kerning, which also was once offered only by high-end typesetting systems, is now possible on the Mac. This month's Fine Print explains when and why you should worry about kerning — and what to do about it.

By now, anyone doing or even contemplating DTP knows that *kern* means more than the California county that gave us Buck Owens and the Buckaroos. In a nutshell, kerning is adjusting the space between two letters to make type look balanced, attractive, and professional — such as tucking a lowercase *e* under a capital *T*. But exactly how important is kerning in a DTP job? And how much kerning do you need to do to make your publication look good? The answer depends on the output quality you desire and on how much effort you're willing to expend to get it.

What I get from my page-layout software usually looks OK, but large type doesn't always come out as tight as I'd like.



Kerning editors, such as this one from Pairs Software, let you completely customize any font to the most exacting specifications.

Publishers of digital typefaces always include a certain number of *kerned pairs* with their fonts. That means the font includes information about how to space frequently used letter combinations so they'll look their best.

High-end typesetting systems come with kerned pairs for virtually all conceivable letter combinations. That's not practical for most DTP setups, however, because that much information would make font files so large that they'd be unwieldy. As a result, digital-typeface publishers such as Adobe and Bitstream include only 100 to 600 kerned pairs with their fonts.

Another problem with using large type is that fonts are kerned to look their best at the size they'll be used at most often. If you use a font such as Times, which is designed and kerned as a body-copy font, it'll look loose at a display-type size. Fortunately, if a kerning pair comes up that the font doesn't handle well at large sizes, you can adjust it manually. All three of the leading programs — PageMaker, QuarkXPress, and Ready,Set,Go! — let you kern manually.

My DTP output doesn't look as slick as the output I used to get from a dedicated typesetting system. I don't want anyone to be able to tell that it was done on a desktop-publishing system.

The results of out-of-the-box desktop typesetting still can't compare with what you can get from a dedicated typesetter. That's because DTP technology sacrifices some kerning quality to obtain optimal size and speed. To recoup some of the polish that distinguishes conventional electronic typesetting from ordinary DTP output, you can buy additional kerned pairs for your fonts from companies such as Pairs Software and Kerningware Marketing, both of Toronto, Ontario, Canada, for about $15 to $25 per font (although you'll have to buy a package containing several fonts).

My newest account is a Fortune *500 company that requires that all its publications follow a rigorous typesetting style guide.*

For custom typography, you need a *kerning editor,* a program that lets you define the kerning data for each style of each font you use. Four such editors are available: KernEdit, from Pairs Software; Kern-Rite, from The Software Shop, Bellmore, New York; LetrTuck, from EDCO Services, Tampa, Florida; and MacKern, from ICOM Simulations, Wheeling, Illinois. Because kerning information is stored in the screen-font file, you can create a suitcase file for each custom-kerned font and load it for a particular client's job. Using a good kerning editor enables DTP publishers to match the quality of the best dedicated typesetting systems.

How much kerning you need really depends on how finicky you or your clients are. One certainty is that the availability of more-powerful kerning options has blurred the distinction between desktop and conventional typesetting.

— James Bradbury

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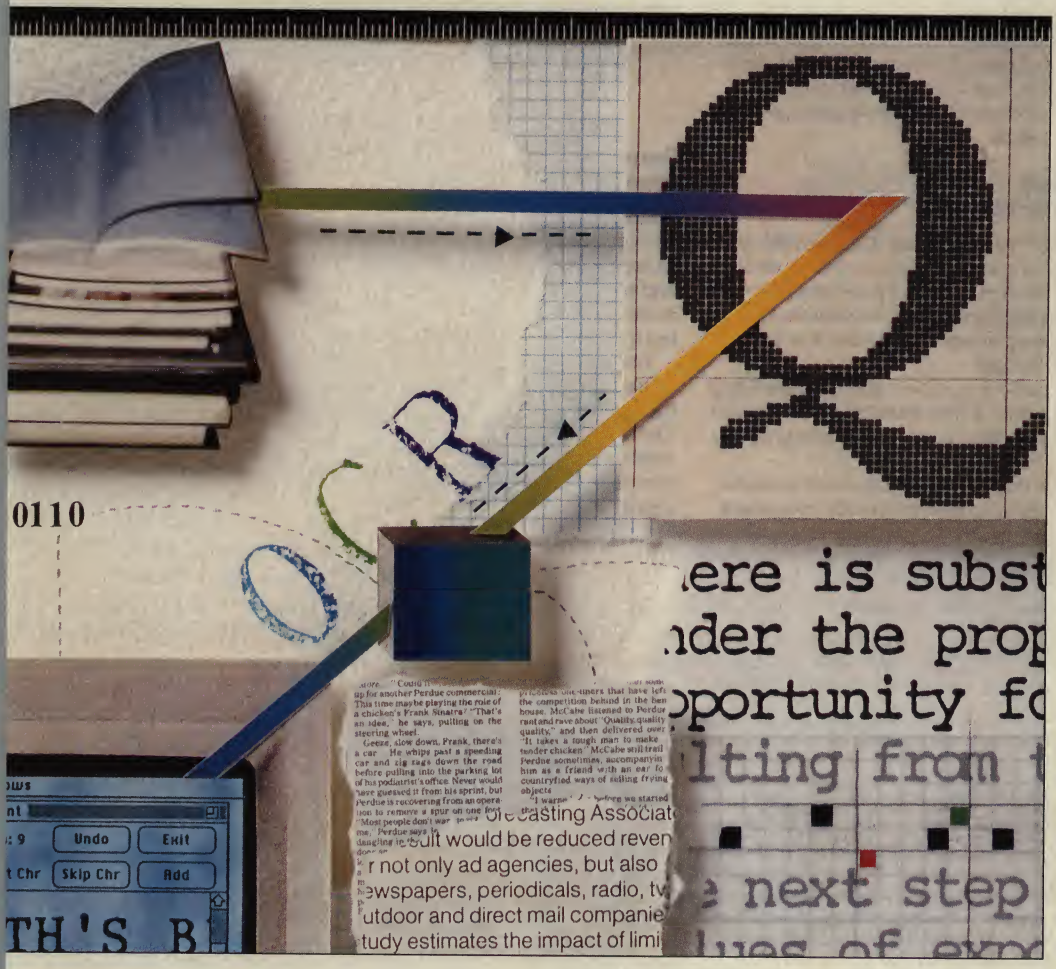
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DTP

DESKTOP FEATURE

The Well-Read Mac



Once hamstrung by the enormous technological demands it placed on software and hardware, optical character recognition is finally becoming not only possible but also practical.

Getting a computer to put something onto paper is relatively easy — all you need is a printer and the right software driver. Going in the opposite direction, however — convincing a computer to read something from paper — is a lot tougher. You need an optical scanner and OCR (optical character recognition) software. Scanners have become commonplace tools because they can grab graphics for use in desktop publishing and image processing. OCR software, though, hasn't been as quick to catch on.

That may be because OCR programs were, until recently, impractical for most applications. Because of the complex algorithms required for "seeing" a graphic page image as letters and numbers, OCR software demanded a heaping portion of both processor performance and RAM. Only $40,000 dedicated OCR systems could dependably translate a wide variety of scanned pages into text.

During the past year, though, both the OCR market and its technology have surged. The combination of a large installed base of scanners, more Macs with fast processors and multiple megabytes of RAM, and improved algorithms from OCR-software developers has propelled OCR into the limelight.

The biggest stumbling block for microcomputer OCR has been its lack of accuracy. Few people are willing to use OCR programs that guarantee accuracy of only 90 to 95 percent. After all, with 2,000 characters on a typical typed page, 95-percent accuracy means 100 mistakes per page — a rate that would get any typist fired on the spot.

And what's more, correcting mistakes isn't always easy. Most OCR programs flag a character they don't know or aren't sure of by substituting an asterisk or some other mark for that character in the document. A spelling checker might

By Phillip Robinson

ILLUSTRATION: RICHARD SCHNEIDER

catch most of those mistakes. More insidious, however, are *substitution* errors, where the OCR program *thinks* it has identified a letter, doesn't flag it, and turns out to be wrong. These mistakes can sometimes be found in text documents, but they are often completely concealed in spreadsheet or database files.

The most primitive OCR programs recognize only their own short lists of fonts, styles, and type sizes. More advanced *trainable* programs aren't paralyzed by new documents, but training takes 30 minutes to several hours for each new font or type of document. When the program shows the magnified scanned image of a letter it doesn't know, you teach the program by pressing the corresponding key, and the program stores the match for later use. The training process takes time and patience, and it is worthwhile only if the same kind of document is going to be scanned frequently or if the original is hundreds of pages long. The newest category in OCR is the *automatic* program, which can teach itself, but even such a program has limitations: It can recognize and learn only a limited number of type sizes and styles.

Even trainable and automatic OCR programs can still be baffled by complex pages — with columns, integrated graphics, and headlines that throw them off the scent of an accurate translation. Desktop publishers are particularly vulnerable to this flaw because they need much more than plain ASCII files. Ideally, they want to be able to capture text with its styles, fonts, tables, and formatting intact.

How It Works

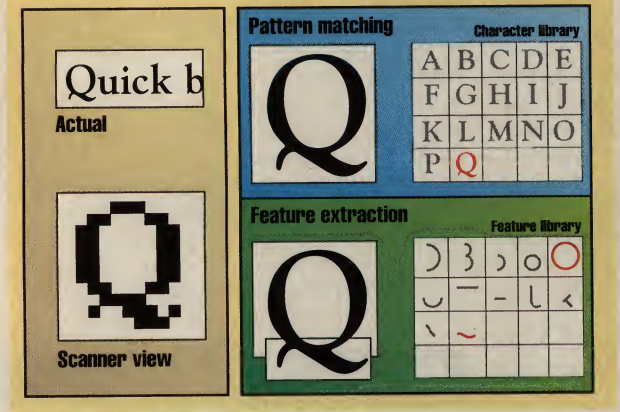
Scanners bounce light off a document and distinguish the amounts that reflect from dark and light areas. The basic way to interpret a scan is as a bit map of the page, but you can't import bit-mapped text into a word processor, spreadsheet, database, or forms-creation program.

To convert a bit-mapped document to text, an OCR program must find a region of related pixels that composes a character and then decide which character — letter, number, or punctuation — that area represents. Advanced recognition tries to recognize the style of the character, such as italic or boldface, and any formatting commands.

Two basic techniques have been developed for such recognition. *Pattern matching,* the older technique, compares an unknown character with a library of stored patterns. A match means the character is recognized. (Trainable programs often ask you to help build a pattern library.) Some programs let you determine the threshold — how close the match must be for a correct guess. Matching works best with nonproportionally spaced text such as dot-matrix output or typed text.

Feature extraction can isolate the topological characteristics of a character, finding the strokes and curves that form it. It then compares these characteristics with a library of features for the possible characters. Feature extraction is independent of character font or style, but it can be confused by distorted or unusual styles.

OCR programs can add context intelligence, storing dictionaries of probable character sequences and even words for help in guessing at questionable characters. A possible danger of this approach is that a dictionary from the wrong field or subject can lead to inappropriate guesses. However, some OCR programs can add to their context knowledge and, with practice on documents of similar type or content, improve their accuracy. Many OCR programs use a combination of these techniques. It's the mass of all the algorithms — along with their tables, lists, matrices, and dictionaries — that causes OCR programs to demand so many megabytes of RAM and disk space.



Scanning Around

Half a dozen untrainable OCR programs are available for the Mac. Although they are sometimes quite fast at processing documents that they understand, I consider them too limited in the fonts and formats they can read. Besides, these packages have been around for years and have been reviewed many times.

The exciting activity in the past year has been the appearance of new versions of powerful trainable programs and the introduction of automatic programs. I tested four trainable programs and two automatic programs, using an Apple Scanner, a Mac II with 5 megabytes of RAM, and an 80-megabyte hard-disk drive. Not all the programs needed that much hardware; most of the trainable programs run on a Mac Plus or SE with 1 megabyte. The programs differ in their speed and accuracy when scanning documents of different styles and scan qualities. (Scan quality depends on such factors as the ability of the scanner and driver software to control resolution, brightness, and contrast; the type of paper; and the continuity of the ink that composes the letters.) And the differences aren't necessarily what you'd expect. A program can have a weakness — such as an inability to read dot-matrix characters accurately — even though it does well on most other types of characters.

The programs differ in many other ways: what file formats they can save data to, how quickly they work, what control they provide over the scanning and recognition processes, and whether they let you edit the file in the OCR program. The trainable programs differ in training methods and in their libraries of trained fonts (they come equipped to read some common types). OCR programs can even differ on what kinds of files they can work on. Although they all work on a graphic image as it comes from a scanner, they don't all work with all scanners. Some don't even need a scanner; they can work from TIFF or other graphics files — good news for fax-modem owners.

Don't assume that the automatic programs are the best. Although you can learn to use them faster, they demand more hardware than the trainables do. And the trainable programs can be adapted to work relatively quickly and accurately with particular documents. If you have only a few document styles that you need to read a lot or if you have one extremely long document, a trainable program can be faster and more accurate than an automatic one.

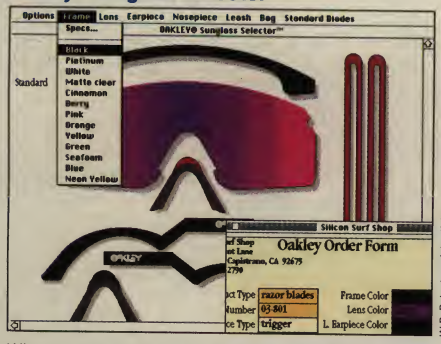


OmniPage 2.0

Caere's OmniPage was the first automatic OCR program for the Mac. It was also the first with *page-recognition* capabilities, which enabled it to recognize page-layout formats and text styles as well as simple characters.

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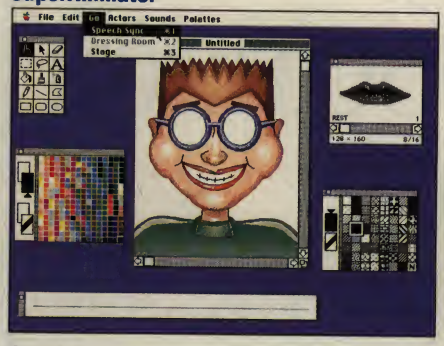
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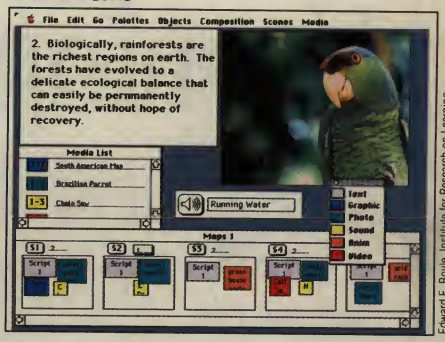
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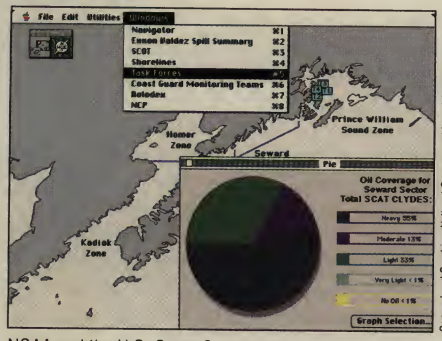
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Edward F. Boyle, Institute for Research on Learning

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Concept and Graphics: National Oceanographic and Atmospheric Administration and Genwest Systems Programming: Peter C. Honebein

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The Guernica Project creative team: Robert Abel, Allen DeBevoise, Jonathan Gibson, Jerry Hesketh, Eric Martin, Morgan Newman

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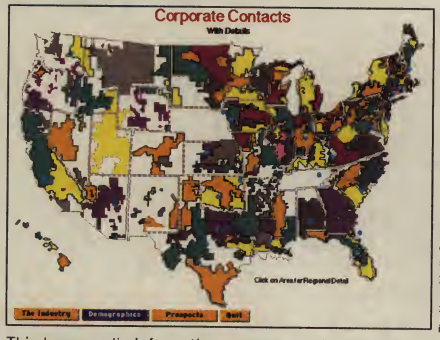
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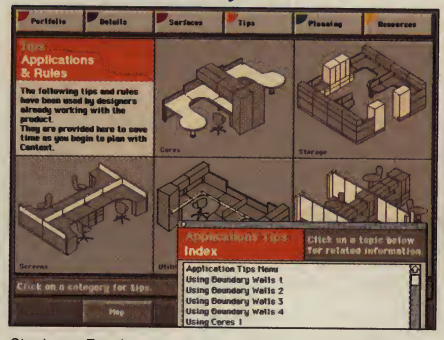
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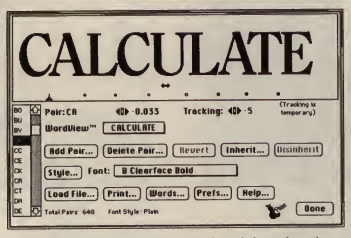
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The Well-Read Mac



Figure 1: OmniPage begins the OCR process by breaking a scanned image into blocks of text and graphics, highlighting text as it's recognized. The small window enlarges the characters being analyzed.

OmniPage requires lots of hardware: a machine equipped with at least a 68020 processor and 4 megabytes of RAM. Version 2.0, which shipped in July, streamlines the menus, adds landscape-orientation scanning and recognition, extends recognition to ten European character sets, increases the file-format options for saving, and supports more scanner models. Caere also claims greater format retention of indentation, justification, tabs, and bold and italic text.

OmniPage recognizes text on a page in several steps: scanning, finding, and outlining text blocks; analyzing the characters; and then saving the results to a built-in editor. As it recognizes text, you can watch the progress on-screen (see Figure 1). The editor has limited power — offering only Cut, Copy, Paste, and Search-and-Replace commands. If you edit the page before saving it, however, all the formatting codes are deleted and you're left with nothing but ASCII characters. The editor doesn't show the format information that the program captures. You must save and close the file and then view it in the intended application to see the formatting.

Before you start a scan, you can tell OmniPage how to approach its structure — as multiple snaking columns (with text continuing from the bottom of one column to the top of the next) or as a single column or table. You can let OmniPage choose the order of text blocks, or you can select the order manually. You can save the settings as template files. You can't, however, intervene in the outlining of text blocks.

Suspect characters can be flagged, and statistics on accuracy can be kept for each recognized file. OmniPage can control the scanner directly or work on saved

TIFF files (but not on compressed TIFF files) of 200-dpi or greater resolution. When scanning graphics, OmniPage offers only limited scanner-tone and -resolution settings.

OmniPage was already one of the easiest OCR programs to install and run, and version 2.0 is even smoother. The manual is surprisingly brief for such a sophisticated program, and there is no on-line help. It doesn't work well with poor-quality dot-matrix prints. Some trainability for the fonts and page layouts that it doesn't handle well would be welcome. It should immediately save files with their formatting rather than wait for you to close the file or quit the program. OmniPage should work in the background under MultiFinder too (although after the 4 megabytes are full, your Mac probably won't have much memory left to do anything else).

Accutext 1.0

Accutext broke OmniPage's monopoly on automatic Mac OCR. This isn't surprising, in view of Xerox's access to its own technology as well as to that of acquired companies Datacopy (scanners) and Kurzweil (dedicated OCR). Like OmniPage, Accutext requires a 68020 machine with at least 4 megabytes of RAM. In fact, in some circumstances, Accutext wants even more than that.

Accutext is so memory hungry because it depends on half a dozen different expert-system routines and a set of "lexicons," each of which contains 350K. The lexicons contain 50,000 words each, as well as double-letter pairs, ligature pairs, probable word beginnings and endings, and rules of grammar for words. Instead of just attempting to recognize individual characters, Accutext tries to identify entire words. After scanning a page and focusing on the text, it guesses what the characters are and then checks to see if they form reasonable words (see Figure 2). If a word is questionable, Accutext marks it and continues. After it finishes a page, the software returns to the questionable words to check if they are similar to other words on the page that it recognized. You can create your own ASCII dictionaries of up to 10,000 words for special environments and load these into the Accutext armory.

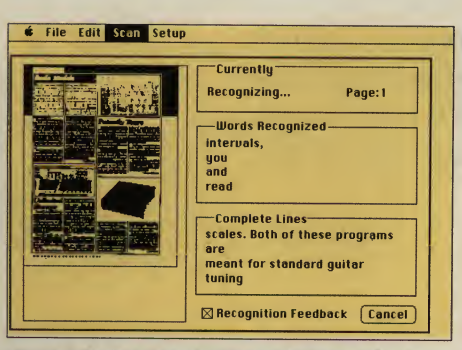


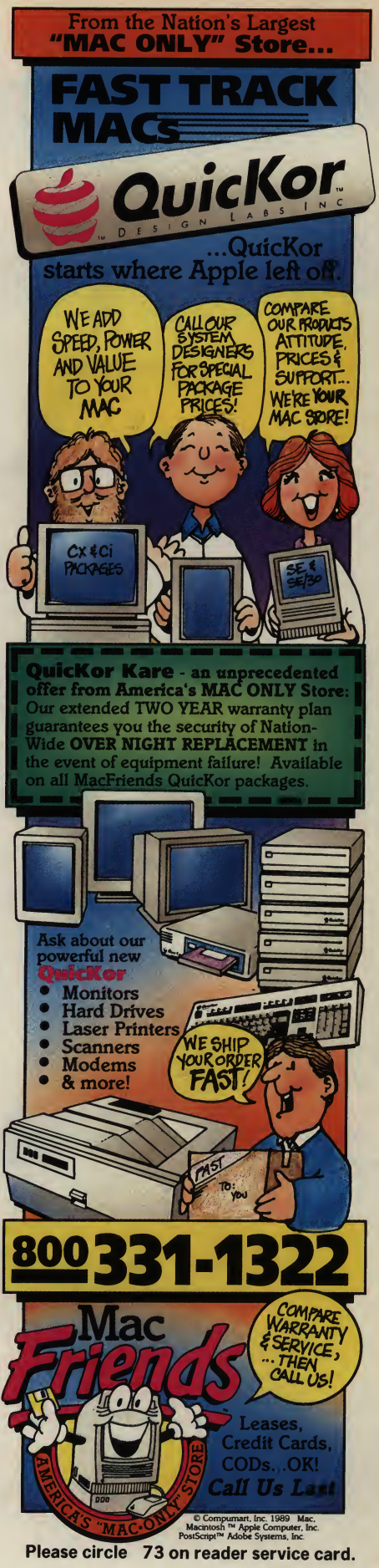
Figure 2: As it scans, Accutext displays an image of the page along with boxes that display the most recently recognized words and lines.

In its default Short Menus mode, Accutext is as easy to use as OmniPage and offers similar features for text scanning: It accepts TIFF and scanner input; offers Word, MacWrite, ASCII, and Excel output; and automatically blocks text areas. Accutext features finer control of the scanning resolution and brightness and several more file formats for saving scans of graphics than OmniPage.

Toggle to the Extended Menus mode, and you find several controls that OmniPage doesn't have — for choosing the number of columns on a page; the markers for questionable characters; and whether letters, numbers, or both will be on a page. You can toggle context verification and search for italics, font size, or underlining. Accutext recognizes the special format of superscripts and subscripts; OmniPage doesn't. Accutext keeps no statistics on its accuracy; OmniPage does, but it counts only unknown characters, not substitution errors.

If you're not happy with the automatic process, the Preview option in Accutext lets you choose text and graphics blocks and manually set the order of text-block analysis. You set text and image zones, link text zones, zoom in and out, delete zones from the scan, and set specific recognition rules for different regions. Think of it as a reverse page-layout program — call it page breakdown. A view of the page displays during scans and recognition, showing which words and lines have been completed. There's no built-in text editor that lets you see what has been recognized, which is a real problem because you must move to the application in which you'll be using the data (remember, you probably don't have room to run under MultiFinder), read the document into it, and then decide whether the scanner controls need adjusting to squeeze out additional accuracy.

In practice, Accutext can save more



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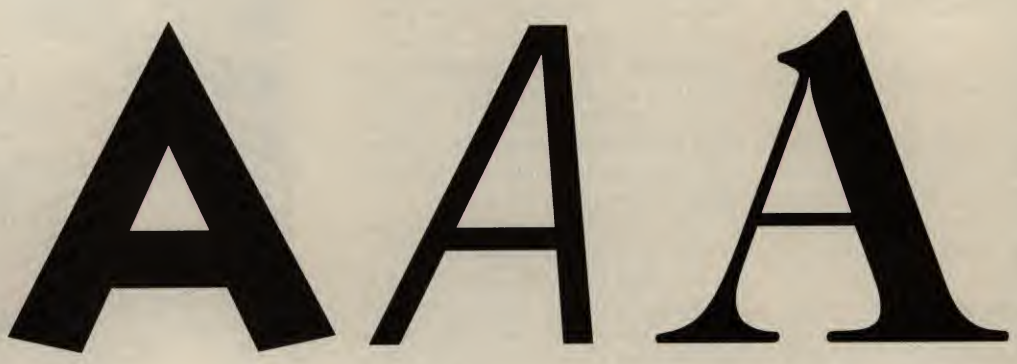
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OCR Features Table

	Automatics		Trainables			
	Accutext	**OmniPage**	**Read-It!**	**ReadStar II Plus**	**TextPert**	**TextScan**
General						
Version	1	2	2.1	1.06	3.01	3
Company	Xerox Imaging Systems	Caere	Olduvai	Innovatic	CTA	Prism Enterprises
Price	$995	$795	$495	$995	$995	$395
Minimum processor	68020 or 68030 Mac	68020 or 68030 Mac	Mac Plus	Mac 512KE	Mac Plus	Mac Plus
Minimum memory	4 MB	4 MB	1 MB	1 MB	1 MB	1 MB
Minimum memory under MultiFinder	4 MB (in 5-MB system)	3 MB	973K	1.9 MB	384K	1.17 MB
Background recognition under MultiFinder	no	no	yes	no	yes	no
On-line help	yes	no	no	no	no	no
Import files						
TIFF	yes	yes	yes	yes	yes	yes
PICT	no	no	yes	no	yes	no
Others	no	no	MacPaint	FOTO	FOTO	no
Scanning controls						
Contrast	none	3 steps	none	16 steps	255 steps	none
Brightness	16 steps	none	16 steps	16 steps	255 steps	16 steps
Resolution	16 steps	3 steps	16 steps	16 steps	none	none
Fat-bit editing	no	no	no	yes	no	no
Zoom image	yes	yes	yes	yes	yes	yes
Landscape OK	yes	yes	yes	no	no	no
Invert OK	no	yes	no	no	yes	no
Auto graphics separation	yes	yes	no	no	yes	no
Auto column definition	yes	yes	no	no	yes	no
Character sizes	8 to 24 point	8 to 72 point	6 to 48 point	6 to 24 point	4 to 72 point	8 to 24 point
Foreign characters	optional lexicons	10 built-in	trainable	trainable	34 built-in	none
Trainable	no	no	yes	yes	yes	yes
Editable type table	no	no	yes	no	yes	no
Threshold control	no	no	yes	no	limited	no
Generate accuracy statistics	no	yes	no	yes	no	no
Spelling checker	yes	no	no	no	no	yes
Output files						
ASCII	yes	yes	yes	yes	yes	yes
Word	yes	yes	no	no	yes	no
MacWrite	yes	yes	no	no	yes	no
Excel	yes	yes	no	no	no	no
WordPerfect	no	yes	no	no	no	no
Speech	no	no	yes	no	no	no
Built-in text editor	no	yes	yes	yes	yes	yes
Search/replace in editor	no	yes	yes	yes	yes	no

format information and is more accurate than OmniPage, but it is often much slower, especially when scanning some pages that contain a mixture of text and graphics. If the graphic elements contain text, as do advertisements in a magazine, they are not rejected automatically and become the object of laborious recognition work. OmniPage doesn't have that problem. You can use Accutext's Preview mechanism to cut these areas out of a scan, although you have to do it for each page layout. (At least there's on-screen help and a toll-free number for technical support to go along with the decent manual.)

Accutext's extra scanning controls put it clearly ahead of OmniPage for use with poor-quality documents, such as the yellowed daisywheel printout I tried. But using them means more time fiddling with controls. If I hadn't stuck to 300 dpi, default contrast, and brightness scans for the tests described in this article, Accutext probably could have reduced its recognition time and raised its accuracy. In the absence of those controls, Accutext sometimes fell behind OmniPage—even on accuracy.



Read-It! 2.1

Read-It! has been around for a while and now comes in two versions: 2.1 for standard scanners and Read-It! O.C.R. Personal for hand scanners. Version 2.1 packs a new Fast Entry mode for quicker training, drivers for more scanners, auto-loading of type tables, and support for landscape orientation.

The heart of Read-It! is its type tables (see Figure 3). The program comes with tables for printers such as the LaserWriter, ImageWriter, and LaserJet; for the Epson dot-matrix family; and for typewriters. It also includes tables for some newspapers. However, the documentation recommends you build your own type tables for better results.

You build type tables by training Read-It! on the sort of text you want to read. There are three training modes: Easy-Learn, Learn, and Learn-and-Recognize. EasyLearn works with monospaced type, matching an on-disk text file with a scanned page of identical text. This is a quick way to start a type table, but even EasyLearn type tables need fine-tuning in another mode. The Learn mode merely steps through a scanned image one character at a time, which gives you a chance to see what its guess is and to enter your own best guess. The Learn-and-Recognize mode lets the software actually get to the work of recognizing a document, while you create or improve a type table.

A table with 10 to 15 examples of each character or ligature (touching characters) can power highly accurate OCR work. Read-It! lets you see type tables

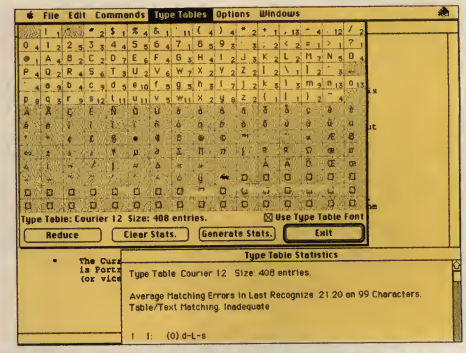
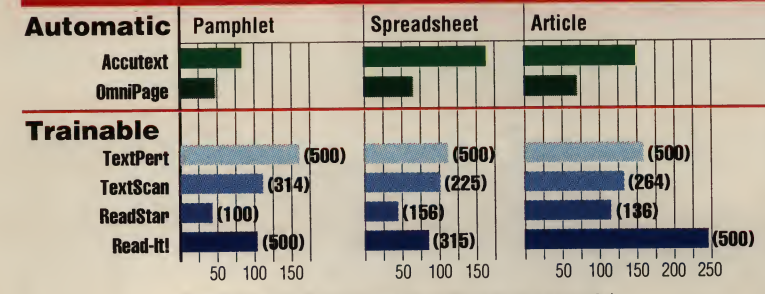


Figure 3: Read-It! has the most-powerful facilities for type-table crafting, with single-character editing.

and edit them (taking out examples you don't want to use). You perfect a type table by using it, checking the accuracy, adding more examples where necessary, and rechecking the accuracy. Making reliable type tables with Read-It! is straightforward, but it takes time, probably half an hour to an hour for even an experienced user.

For recognition work, Read-It! can automatically select the best of the available type tables or ask you to load a table. Then it scans the page, and the graphic image appears in a window. Read-It! makes sharp scanned images, and the window helps you see when the scanner controls need adjusting. (Read-It! can also work on TIFF or PICT files.) Block

OCR Time Comparison



	Pamphlet	Spreadsheet	Article	Format results
Automatic				
Accutext	0	52	10	Nearly all retained
OmniPage	0	5	0	All retained
Trainable				
TextPert	142	45	7	Some retained
TextScan	4	5	14	Little retained
ReadStar	3	24	30	None retained
Read-It!	44	44	224	None retained

Teaching and Text-Recognition Times (in seconds)
(Time spent training the software in parentheses)

Number of Text-Reading Errors

Given an easy recognition task — such as handling a page of monospaced, clearly printed text — or an unlimited training time, any OCR package can achieve accuracy of greater than 99 percent. I chose three types of test documents — a pamphlet, a spreadsheet, and an article from *MacUser*— specifically because they wouldn't be easy. I also limited testing to a maximum of either one complete run through the sample text or 500 seconds, whichever was longer.

The pamphlet was a 1,500-character page from a user-group guide, printed in one font with two styles. It had small type with some thin edges. The spreadsheet was a partial page from an Apple Connectivity index printed in three fonts. It was selected because it posed a format problem and had some thin type. The *MacUser* article was a page from Michael Swaine's Card Tricks column — printed almost entirely in one font and containing about 3,500 characters. It packed a lot of proportional text onto a single page.

All times, measured in seconds, include scanning time. For all but TextPert, the scanning time was approximately 27 seconds; for TextPert it was 62 seconds. Times don't include the time for defining intended reading areas on the page.

Error and speed measurements of trainable packages are difficult to compare directly. The errors counted included omission, substitution, and recognition mistakes.

Tests are valuable indicators, but you should note that because OCR work differs so much from document to document, a different selection of samples might have caused different programs to show the highest error rates. Read-It!'s errors on the article, for instance, and TextPert's problems with the thin letters of the pamphlet skewed these results.

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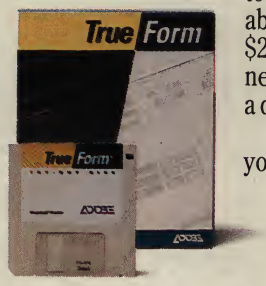
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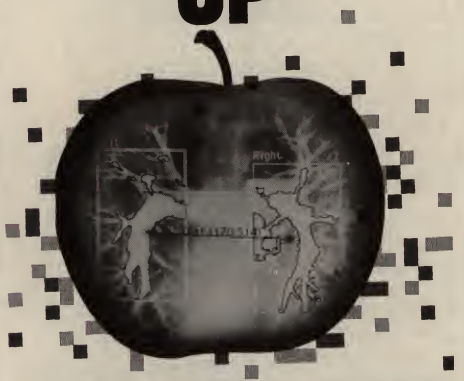
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out the areas to recognize and then use the Recognition command (or the Learn-and-Recognize command). You can save complex block patterns in a template for future use.

Read-It! doesn't jump right in and start creating a text file — it first isolates the lines and characters of the image — which may explain why it's one of the slower packages (and becomes slower as the type tables grow larger). When complete, the recognized text appears in an Editor window, where you can use the Cut, Copy, Paste, and Search-and-Replace commands.

The recognition controls — from tolerance thresholds for matching patterns, to the Speech control for having the Mac speak the words aloud as it recognizes them — are more subtle and extensive than those offered by any of the other OCR programs.

Read-It! is one of only two OCR programs (TextPert is the other) that can run its recognition work in the background under MultiFinder, freeing your Mac for other work. Read-It! also has a low price, easy training, high possible accuracy, and a good manual (although short on examples, especially concerning the advanced controls). It can't read underlined text — a major flaw — and is relatively slow.

Although Read-It! has a Batch Recognize command for a sequence of saved scanned images, it isn't as easy to use on multipage documents as it could be. Olduvai claims that version 3.0 will ship with added automatic abilities by the end of 1989.

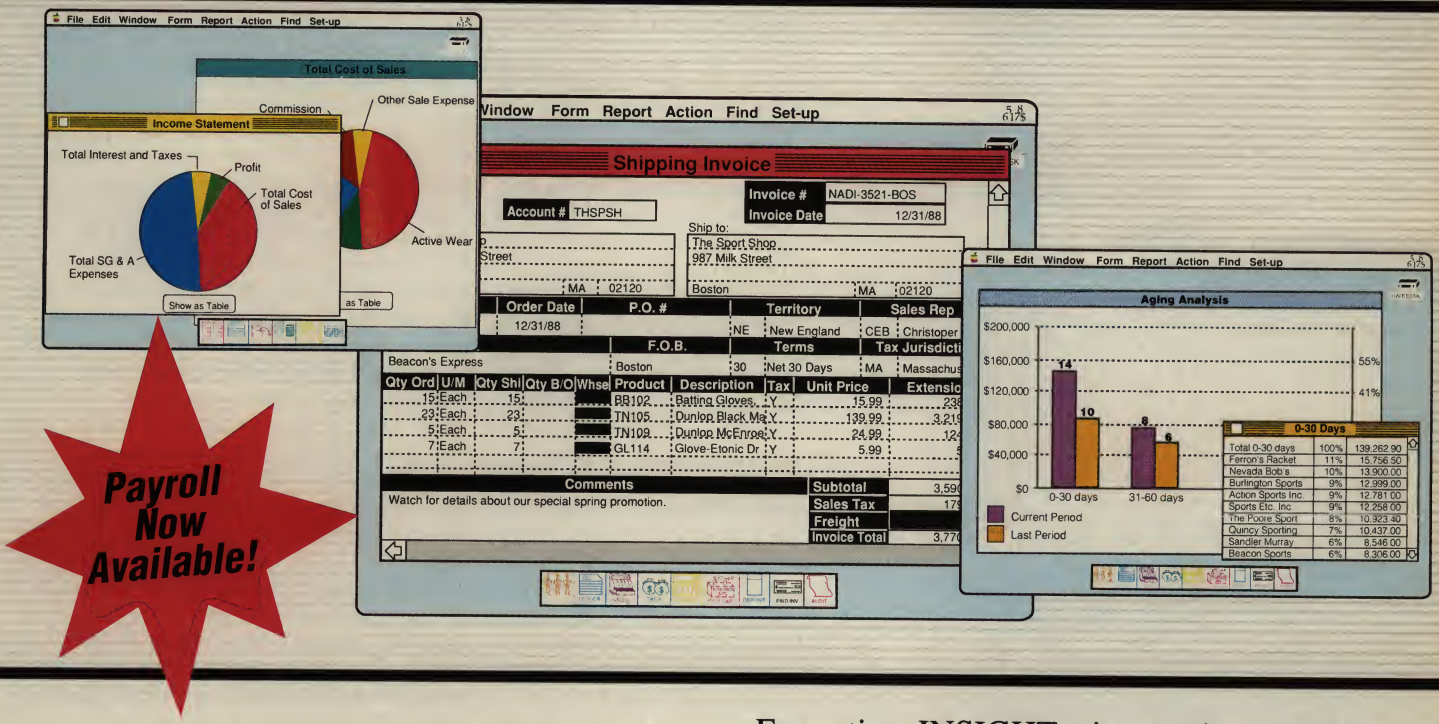
ReadStar II Plus 1.06

ReadStar II Plus 1.06 is fast but can be a bit confusing to train and run. It's also somewhat tougher than the other OCR programs to install and run because of key-disk copy protection (it's the only copy-protected OCR package). ReadStar begins by letting you scan the entire page, before beginning the recognition work. (It can also work on TIFF or FOTO files, the old PageMaker format.) Graphics controls are provided for selecting the area to scan, the brightness and contrast, and even the half-tone pattern when you're using a scanner that supports halftoning.

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The Well-Read Mac

ability in these OCR packages and a nice touch for cleaning up dirty scans), selecting portions of it for recognition, and beginning the recognition process.

Before starting the recognition process, you need to tell ReadStar a few things about the document: Is it monospaced or proportionally spaced? Does it have tables? Is the text justified? Then you either load a font table that's already on-disk or you teach ReadStar a new font table for this document. You can save new fonts as their own files and then group them to automatically load with a single command. (Each type style needs its own font training, so groups are often practical for complex documents.)

You can set the recognition to Automatic, Learning, or Semi-automatic. Automatic runs right through a document, using whatever knowledge of the font is already loaded. Any questionable characters are left as asterisks, so ReadStar has a low substitution-error rate.

ReadStar doesn't isolate characters as cleanly as the slower Read-It!, but it is quick: Even while it's showing you characters it isn't sure of, it works ahead, finding characters it does know. The more it learns, the faster it runs, which makes for quick training and recognition. The font tables you build, however, aren't as open to editing as in Read-It!

The Semi-automatic mode proceeds with recognition but puts characters it's unsure of into the identification window and asks for your assistance. A Statistics window gives you details on the time and accuracy of the learning and recognition processes (see Figure 4). The recognized text then appears in a built-in Editor window, where there are typical Cut, Copy, Paste, and Search-and-Replace commands. You can save the file as ASCII text.

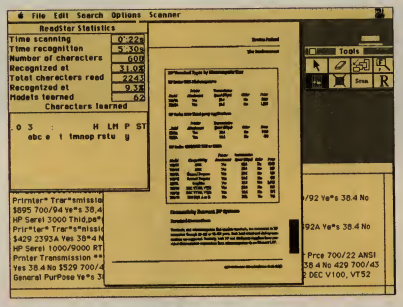


Figure 4: ReadStar is the only package that monitors the duration and accuracy of its work. It provides statistics that can help you fine-tune a type table.

Innovatic is working on a new OCR package for the Mac that will add "omnifont" and automatic abilities. It will use technology from ReadStar Express, an automatic PC OCR program that is already shipping, and is scheduled for release by the end of 1989.

TextPert 3.01

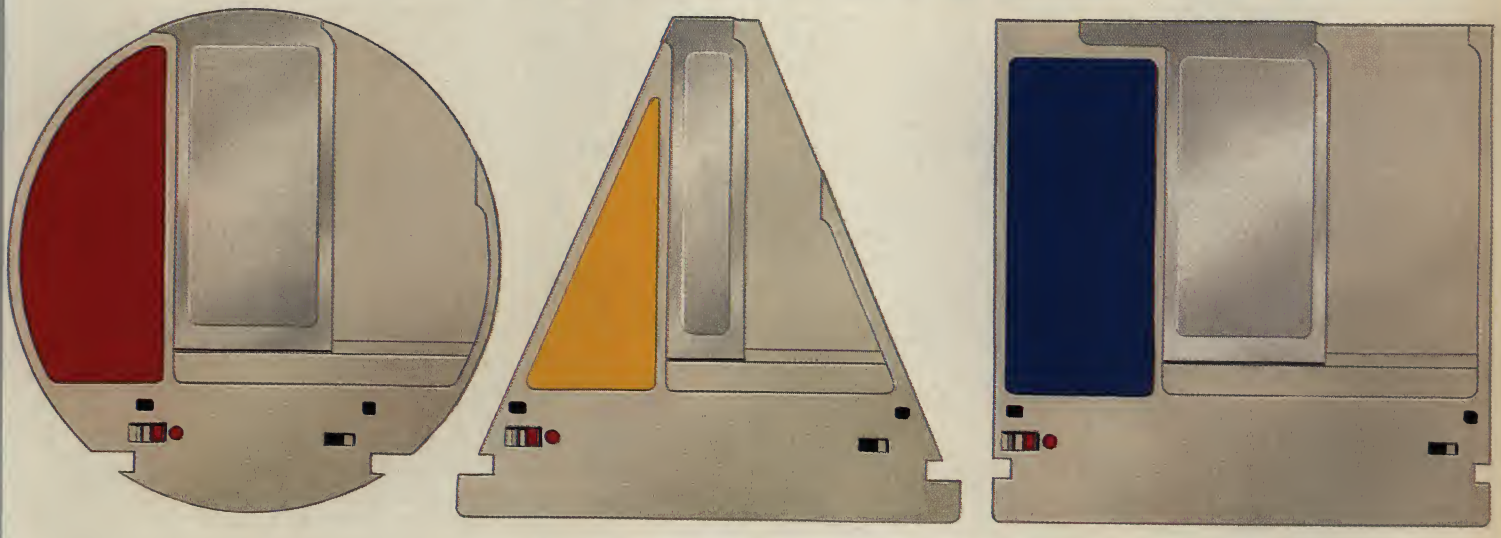
TextPert took longer to train than any other program I tested, but it has some impressive features that can make it a winner in some settings, especially if you do lots of scanning of a particular font or type. One advantage is fluency in many languages and alphabets. Some programs add the ability to read accented characters and then claim support for foreign languages. TextPert actually works with 6 different alphabets (including Cyrillic, Hebrew, and Greek) and 34 Indo-European languages. It doesn't have lexicons for all of the Indo-European languages, but it does support the entire character sets. It also has one of the widest ranges of readable character sizes — TextPert works on text from 4 to 72 points.

The program has similar fluency with its input and output files; it reads PICT and TIFF files and saves in MacWrite, Word, and ASCII formats. The other trainable packages save only in ASCII format. There's also a Financial Forms option for assigning tabs to an ASCII file so that it can read neatly into a table maker or spreadsheet program.

For some reason, TextPert takes more than a minute to scan a page. All the other packages needed only 27 seconds. That's the first speed bump. (You can still come out ahead, though, by using TextPert's flexible contrast and brightness controls, which allow more adjustment than the other packages' controls. These controls can mean a better scan sooner — for a more accurate read.) You can save a bit of time because TextPert is able to define text blocks automatically on the scanned image (see Figure 5). None of the other trainable packages sports this ability.

When you get to teaching, though, TextPert is simply a sloth. It works its way from character to character, never reading ahead of you and always asking for a mouse-button click to confirm your identification. In fact, each time you identify a character, the Mac's disk has to work. You need ten minutes or more just to identify your way through a couple of paragraphs and an hour or more for a long

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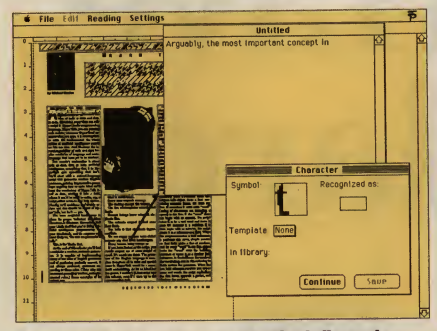


Figure 5: TextPert automatically defines the blocks to read and the order in which they'll be read (in the window at left), asks for help identifying symbols (window at lower right), and stores the text in a built-in editor (window at upper right).

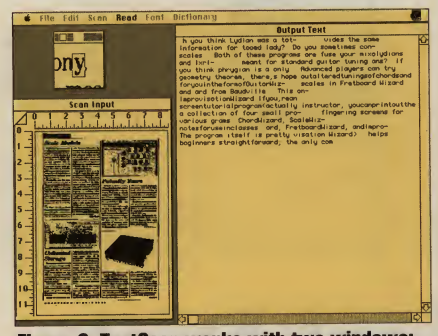


Figure 6: TextScan works with two windows: one for blocking out the text to recognize (and for setting formats for each block) and another for displaying the recognized text.

document to be thoroughly introduced to the system. TextPert gives another bow to automatic reading (as with its block-definition function) by letting you start type tables or templates with the Mac's own fonts. However, that won't aid your accuracy unless your document is Mac-printed. The program doesn't come with any other fonts.

The recognition process is also on the slow side, although it is not the slowest among the programs we tested. Also, because TextPert can run in the background under MultiFinder (and needs little RAM to do so), a busy, RAM-filled Mac can gain some time in the recognition stage. (Read-It! is the only other package that is able to run in the MultiFinder background.)



TextScan 3.0

At first glance, TextScan looks feeble compared with the other OCR packages. Its menus are short, containing only the most-fundamental commands. You can use it to Open and Close files, edit a text file — but there's no Search-and-Replace function — scan a page and set the brightness of the scan, check the font that's loaded, check the dictionary, and teach or recognize a file. And that appears to be it. You'll find that in some cases, the restricted feeling this program gives you proves true; in other cases, it is an illusion.

As an example of the real limitations of TextScan, the brightness check is the *only* scanner control you get. You can set the size and part of the page to scan, but you cannot change the resolution or contrast of the scan. Furthermore, you cannot work on inverted or landscape text or on any foreign characters.

An example of an illusory limitation is the control of areas to be read. You can set the areas of text to be recognized and the order in which they'll be handled. You can also attach formats such as word wrap and proportional text to each block. But there aren't any tool palettes, pull-down menus, on-screen help, or other indications of how to do any of these things. You have to read the manual and learn certain key combinations (Command-W to delete a character guess, for instance) and special places to click the mouse for pop-up menus.

Some commands accomplish more than one function, which can be somewhat confusing. For instance, you load an image file, a text file, a saved type table, or a dictionary all with the same Open command. Each kind of file goes to the appropriate place in TextScan, naturally, but it is not immediately clear that this single command is the one you need to use for all of these activities.

Once an image has been loaded or scanned, you manually set up the blocks to read and either teach or run through those blocks (Run mode uses any font you've loaded from disk). You can switch from Teach to Run mode during a recognition effort (so the work done up to a certain point isn't lost) to return to the beginning of the file. During a teaching session, the program works ahead of and behind your current position, guessing at new characters and fixing old ones from new identifications. You can watch all this happen in a window on-screen (see Figure 6). The block patterns can be saved on-disk, and several pages can be

The Bottom Line

If the price of both the OCR package and the hardware to run it isn't a critical factor, OmniPage is the best choice for most situations. Its only drawbacks are that it's not trainable (so you can't improve its accuracy on tough documents except by fine-tuning the scan), doesn't have much scanner control (which only aggravates the previous complaint), and needs a 68020 or 68030 machine with 4 megabytes of RAM.

Accutext is an impressive challenger, but it isn't as smooth as OmniPage, because it takes longer and makes more mistakes. OmniPage had better look out for the next version of Accutext, though. And Accutext can almost double as a graphics-scanning package, with its controls and variety of graphic-file outputs.

Trainable programs take longer than automatic ones on short documents because of the time they spend identifying blocks of text and the time you spend teaching them to recognize fonts. If a page has multiple fonts or type styles — even just italics and boldface — most trainable packages will be thrown for a loop. None of them comes close to OmniPage or Accutext for saving formats, either. If you want to keep indents, tables, spreadsheets, and character styles, stick with the automatic programs.

There are only three good reasons to use a trainable package: One is to squeeze the greatest possible accuracy out of a repeated scan — of either a long document or very similar documents. Another reason is to deal with an odd font that baffles OmniPage and Accutext. Finally, you may need to get some OCR done without a large investment in software and hardware.

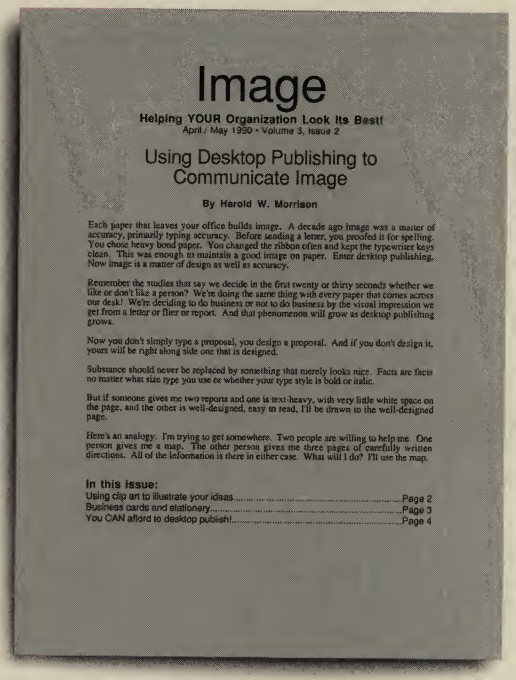
If you're concerned about accuracy and have lots of time to fine-tune a recognition font, you might try Read-It! or TextPert. They have plenty of knobs and buttons for such fiddling. (TextPert may also be the only solution if you're dealing with a language or alphabet the other packages don't cover.)

If you're looking for the cheapest OCR program with good ability, choose TextScan. But if you want a general-purpose OCR tool without laying out the bucks for the automatic class, avoid TextPert. You'll spend far too much time training — ReadStar II Plus looked best in my tests.

Don't fool yourself by saving a few bucks up front by buying a trainable package, though. Any package will do fine on easy stuff such as business letters printed on a laser printer. Two final tips: Buy a good scanner after you've checked that your package has a driver for it (see "Scanning the Color Horizon," June '89) and a good spelling checker (an excellent choice is Thunder II — see StartUp, October '89). Both are vital to practical OCR.

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April / May 1990 • Volume 3, Issue 2

Using Desktop Publishing to Communicate Image

By Harold W. Morrison

Each paper that leaves your office builds image. A decade ago image was a matter of accuracy, primarily typing accuracy. Before sending a letter, you proofed it for spelling. You chose heavy bond paper. You changed the ribbon often and kept the typewriter keys clean. This was enough to maintain a good image on paper. Enter desktop publishing. Now image is a matter of design as well as accuracy.

Remember the studies that say we decide in the first twenty or thirty seconds whether we like or don't like a person? We're doing the same thing with every paper that comes across our desk! We're deciding to do business or not to do business by the visual impression we get from a letter or flier or report. And that phenomenon will grow as desktop publishing grows.

Now you don't simply type a proposal, you design a proposal. And if you don't design it, yours will be right along side one that is designed.

Substance should never be replaced by something that merely looks nice. Facts are facts no matter what size type you use or whether your type style is bold or italic.

But if someone gives me two reports and one is text-heavy, with very little white space on the page, and the other is well-designed, easy to read, I'll be drawn to the well-designed page.

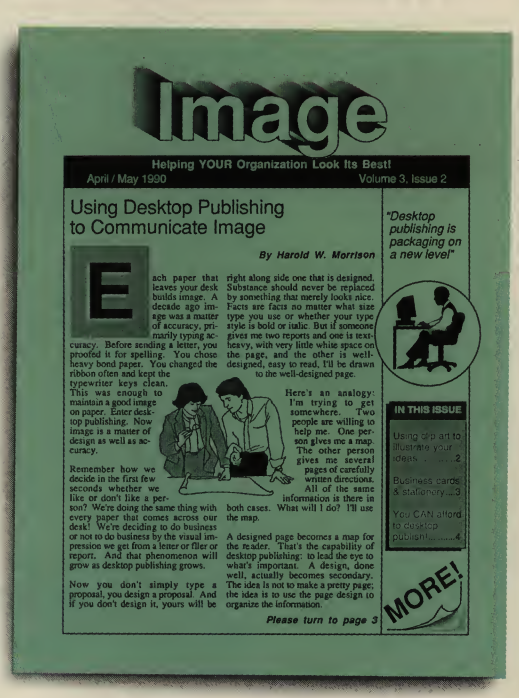
Here's an analogy: I'm trying to get somewhere. Two people are willing to help me. One person gives me a map. The other person gives me three pages of carefully written directions. All of the information is there in either case. What will I do? I'll use the map.

In this issue:

Using clip art to illustrate your ideas....Page 2
Business cards and stationery....Page 3
You CAN afford to desktop publish!....Page 4

Your word processor alone.

Soon After.



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April / May 1990 Volume 3, Issue 2

Using Desktop Publishing to Communicate Image

By Harold W. Morrison

"Desktop publishing is packaging on a new level"

Each paper that leaves your desk builds image. A decade ago image was a matter of accuracy, primarily typing accuracy. Before sending a letter, you proofed it for spelling. You chose heavy bond paper. You changed the ribbon often and kept the typewriter keys clean. This was enough to maintain a good image on paper. Enter desktop publishing. Now image is a matter of design as well as accuracy.

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Now you don't simply type a proposal, you design a proposal. And if you don't design it, yours will be right along side one that is designed. Substance should never be replaced by something that merely looks nice. Facts are facts no matter what size type you use or whether your type style is bold or italic. But if someone gives me two reports and one is text-heavy, with very little white space on the page, and the other is well-designed, easy to read, I'll be drawn to the well-designed page.

Here's an analogy: I'm trying to get somewhere. Two people are willing to help me. One person gives me a map. The other person gives me several pages of carefully written directions. All of the same information is there in both cases. What will I do? I'll use the map.

A designed page becomes a map for the reader. That's the capability of desktop publishing: to lead the eye to what's important. A design, done well, actually becomes secondary. The idea is not to make a pretty page; the idea is to use the page design to organize the information.

Please turn to page 3

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TextScan boasts the top accuracy for trainable OCR packages.

collected for reading into a single file.

As with other trainable packages, TextScan in the Teach mode asks for help in identifying characters, but TextScan goes beyond using the templates or type tables you teach it and also checks spelling with a dictionary. You can use the small or large dictionaries that are included with TextScan or create a custom dictionary to help TextScan analyze and verify character guesses. You can also add a document's unrecognized words to the dictionary.

The more fonts you load and the larger the dictionary in memory, the slower this program will run. In fact, keeping a mixture of fonts in the library can actually impair accuracy too, according to the manual.

TextScan had the second-fastest training times in the survey, but it wasn't as swift in the recognition competition. It boasts the top accuracy for trainable packages. These results may be due to the emphasis on feature extraction instead of matrix matching — meaning less need for multiple examples of each character in each font during training but more analysis of shapes during recognition. The brief manual contains a discussion by the programmer of the underlying technology — an illuminating touch.

The final files are saved with virtually no formatting intact, and TextScan has real trouble maintaining the spaces between words and differentiating apostrophes and commas with some fonts.

Phillip Robinson writes books and articles about computer graphics on Macs, PCs, and workstations. He is an editor for the *Architect's PC Newsletter*.

Report Cards

Accutext 1.0 ★★★★

Comments: Most sophisticated Mac OCR package with context intelligence and plenty of control of scanner and recognition details. **Best Feature:** Intelligence through lexicons of words, letter combinations, and grammar rules. **Worst Features:** No built-in editor for viewing recognized text. So hungry for RAM that even 5-megabyte systems don't have much space to run another editor alongside. **List Price:** $995 ($995 for European-languages version). Requires 68020-based Mac or later with 4 megabytes of RAM. Needs 5 megabytes under MultiFinder. Xerox Imaging Systems, 1215 Terra Bella Ave., Mountain View, CA 94043-1833; (415) 965-7900.

OmniPage 2.0 ★★★★½

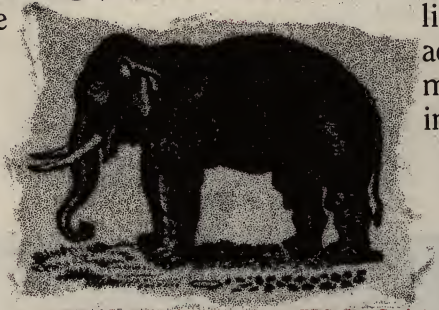
Comments: Simplest OCR package for the Mac because it includes page recogni-

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tion and automatic action with ability to distinguish text from graphics. **Best Feature:** Handles most pages without any control adjustments. **Worst Features:** Limited control flexibility for scans, fonts, and layouts it doesn't understand. **List Price:** $795. Requires 4 megabytes of RAM and 8 megabytes of hard-disk space. Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; (408) 395-7000.

Read-It! 2.1

Comments: Read-It! is easy to train, has extensive options for editing types, and features scan control, but it isn't fast or highly accurate. **Best Feature:** Background processing under MultiFinder. **Worst Feature:** Can't read underlined text. **List Price:** $495 ($29 upgrade from version 2.0). Requires Mac Plus, SE, or II with at least 1 megabyte of RAM available (2 megabytes recommended). Olduvai Corp., 7520 Red Road, Suite A, South Miami, FL 33143; (305) 665-4665.

ReadStar II Plus 1.06

Comments: ReadStar II Plus is fast once you get it going, but it is confusing to train and is limited in file import (scanned images) and export (finished text files). **Best Feature:** Fast recognition with low substitution-error rate. **Worst Feature:** Copy protection. **List Price:** $995. Requires Mac Plus or later with at least 2 megabytes of RAM. Copy-protected. Innovatic, Inc., 1911 N. Fort Myer Drive, Suite 708, Arlington, VA, 22209; (703) 522-3053.

TextPert 3.01

Comments: Tough-to-train package offers more file-input and -output flexibility than other trainable OCR software and has a few touches of automatic operation. **Best Feature:** Supports many languages and alphabets. **Worst Feature:** Slow training. **List Price:** $995. Requires Mac Plus or later with at least 1 megabyte of RAM. SE or II recommended. Not copy-protected in United States. CTA, Inc., 747 Third Ave., Third Floor, New York, NY 10017; (212) 935-2280.

TextScan 3.0

Comments: Inexpensive package that's quite accurate with only a little training. **Best Feature:** Comes with character tables and built-in dictionary to check spelling. **Worst Feature:** Hidden commands are hard to find and learn. **List Price:** $395. Requires Mac Plus or later with 1 megabyte of memory (2 megabytes recommended). Prism Enterprises, Inc., 14703E Baltimore Ave., Suite 248, Laurel, MD 20707; (301) 604-6611.

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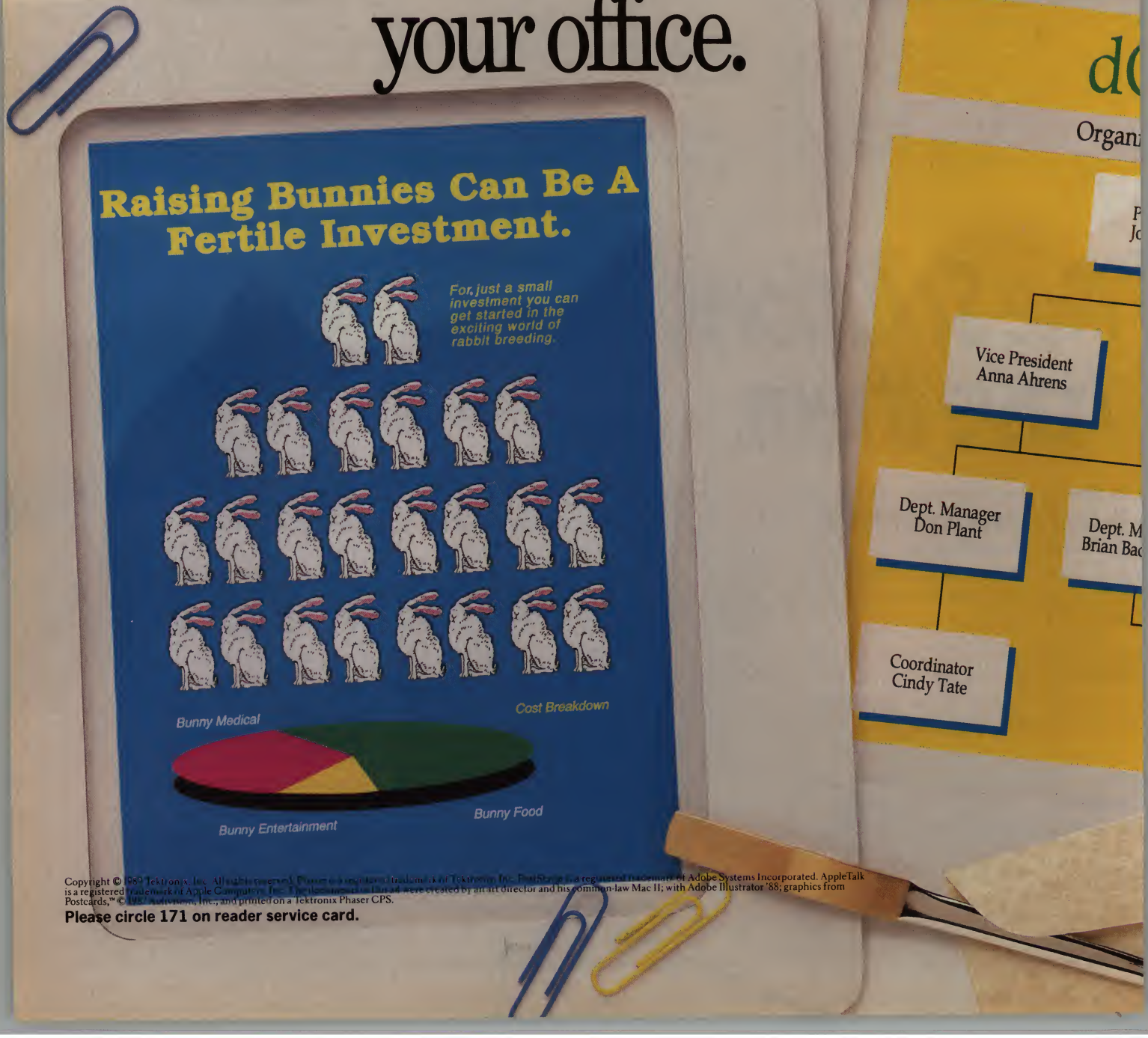
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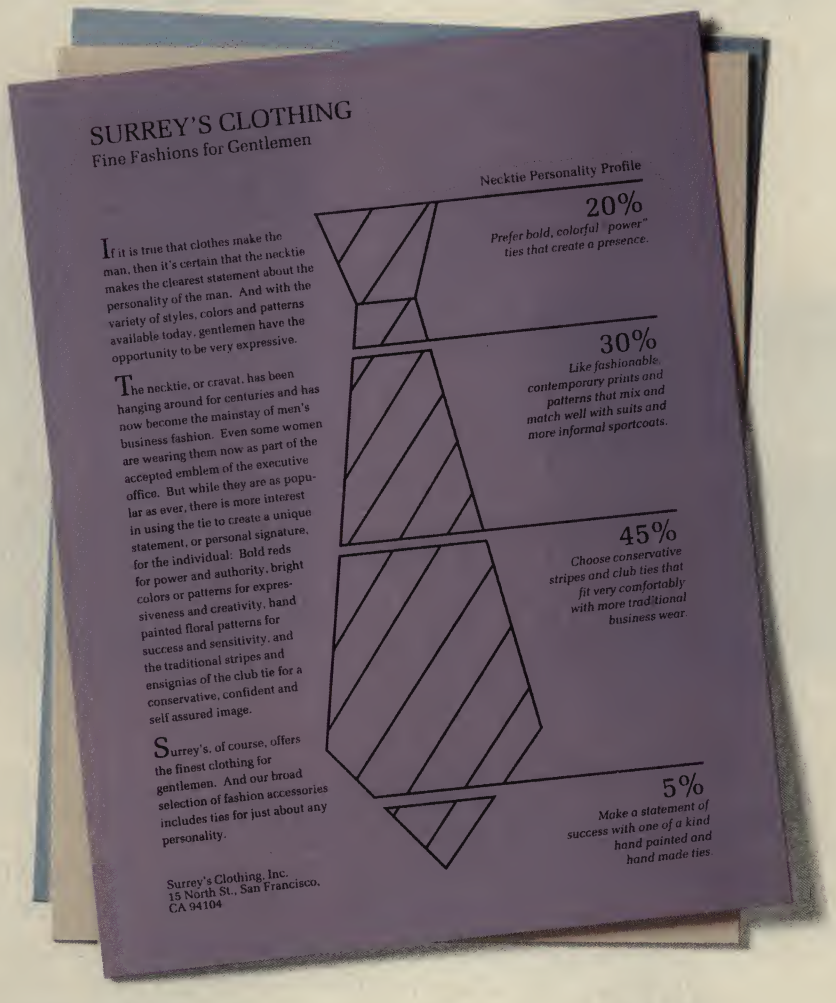
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BRIDGES

The AppleTalk network system has held up admirably over the years as networks have grown at a phenomenal rate, both in number and size. But AppleTalk has finally outgrown its original design, so it got a face-lift this year. This month we take a look at Phase 2: what's new and what's in it for you. Currents gives you a quick rundown on LocalTalk-to-EtherTalk routers. A couple of new kids are on the block, and all the old favorites are getting a Phase 2 upgrade.

WRITE TO

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EDITED BY HENRY BORTMAN

EtherTalk Router Roundup

Now that Apple is shipping a router that implements AppleTalk Phase 2 protocols, other router vendors are rushing to follow suit. Users of LocalTalk-to-LocalTalk routers (often incorrectly called bridges) needn't rush to upgrade to Phase 2 (although vendors of these routers are all shipping Phase 2-compatible versions), because LocalTalk is not affected significantly by the changes in Phase 2. And there are no Phase 1 LocalTalk-to-TokenTalk routers, because AppleTalk Phase 1 didn't support TokenTalk. But numerous Phase 1 LocalTalk-to-EtherTalk routers are installed in large corporate networks, and managers of these networks must figure out how and when to upgrade to Phase 2. Here's a brief rundown of what's available in EtherTalk routers, both upgrades from vendors of Phase 1 routers and new entries into the field.

All these products will be compliant with AppleTalk Phase 2 by the time you read this or shortly thereafter. All offer some type of utility that lets you configure a mixed Phase1/Phase 2 network, for those who either can't or don't want to make the transition to Phase 2 in one shot.

Apple's software offering, the **AppleTalk Internet Router** ($399), runs on a Macintosh and is fully Phase 2-compliant (no surprise there), with support for LocalTalk, EtherTalk, and TokenTalk. The Internet Router can support up to eight network connections — one or two LocalTalk and the other six EtherTalk or TokenTalk.

Liaison ($295), from Infosphere, the other software router that runs on a Mac, will implement Phase 2 protocols with version 2.1. Liaison 2.1 supports two network connections, and it can be used for dial-in access to an AppleTalk network. Upgrades are free to anyone who purchased the product after April 15, 1989.

Kinetics has a large installed base of Phase 1 **FastPath 4** hardware routers ($2,795). Its Phase 2 upgrade kit (software plus a new manual) costs $85. FastPath routers support TCP/IP and DECnet protocols as well as AppleTalk.

Cayman's **GatorBox** ($2,795) is also a hardware router. When used with GatorShare software ($1,995), the GatorBox functions as an AFP-to-NFS gateway, which lets UNIX file servers appear on the Mac desktop, as do AppleShare servers. Upgrading a GatorBox to Phase 2 requires only software, which is available for a nominal charge.

Network Resources offers three LocalTalk-to-EtherTalk routers. The **AT2000E** ($995) allows a single LocalTalk device (such as a Mac or LaserWriter) to be connected directly to an EtherTalk backbone. The **AT2002E** ($1,295) is similar, allowing two single-device connections. The **LT2000E** ($1,995) enables a LocalTalk network to be joined to an EtherTalk network. All three routers can support broadband and optical-fiber EtherTalk connections as well as thick and thin coaxial cable. Network Resources implemented its own extended-addressing scheme even before Apple announced Phase 2. Its products are now Phase 2-compatible, and upgrades are free.

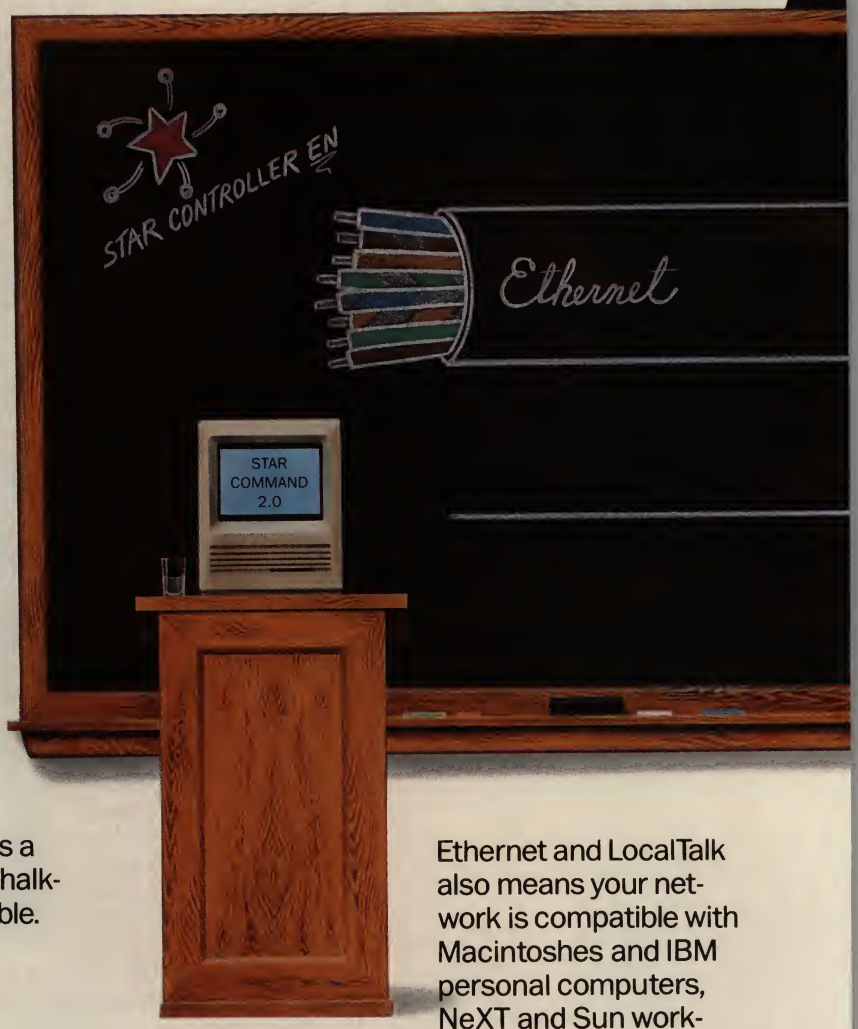


Two new LocalTalk-to-EtherTalk routers will also support Phase 2. Dove's **FastNet AE** ($1,999) sports a SCSI port, which Dove says it plans to use but won't say what for. Shiva will offer a router (no name or price yet) with one Ethernet connection and two serial ports, which can be used either to connect LocalTalk networks or, in conjunction with dial-up lines, to provide wide-area connections between two EtherTalk networks.

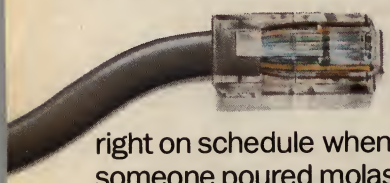
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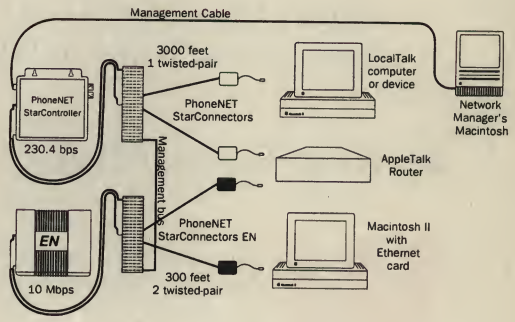
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Finally Phase 2

AppleTalk networks get bigger and more efficient and learn to talk in tokens.

By Kurt VanderSluis

When Apple designed the AppleTalk network system, it was thinking small. Apple envisioned work groups of six or seven users sharing a LaserWriter. But as Macs became more popular, AppleTalk networks grew.

To provide some network-strain relief, third-party vendors have developed *routers,* which allow two or more LocalTalk work groups to be connected to form an *internet.* (AppleTalk is a set of communications protocols; LocalTalk is network hardware.) Routers, when used properly, allow the size of an internet to grow without slowing network traffic to a crawl.

This approach was adequate for most small- to medium-sized business environments, but users at large corporations were still frustrated by the slow speed of LocalTalk. Apple addressed this problem by offering EtherTalk, a hybrid system that supports AppleTalk services such as access to printers and AppleShare servers over high-speed Ethernet *data links* (wiring and data-transmission systems).

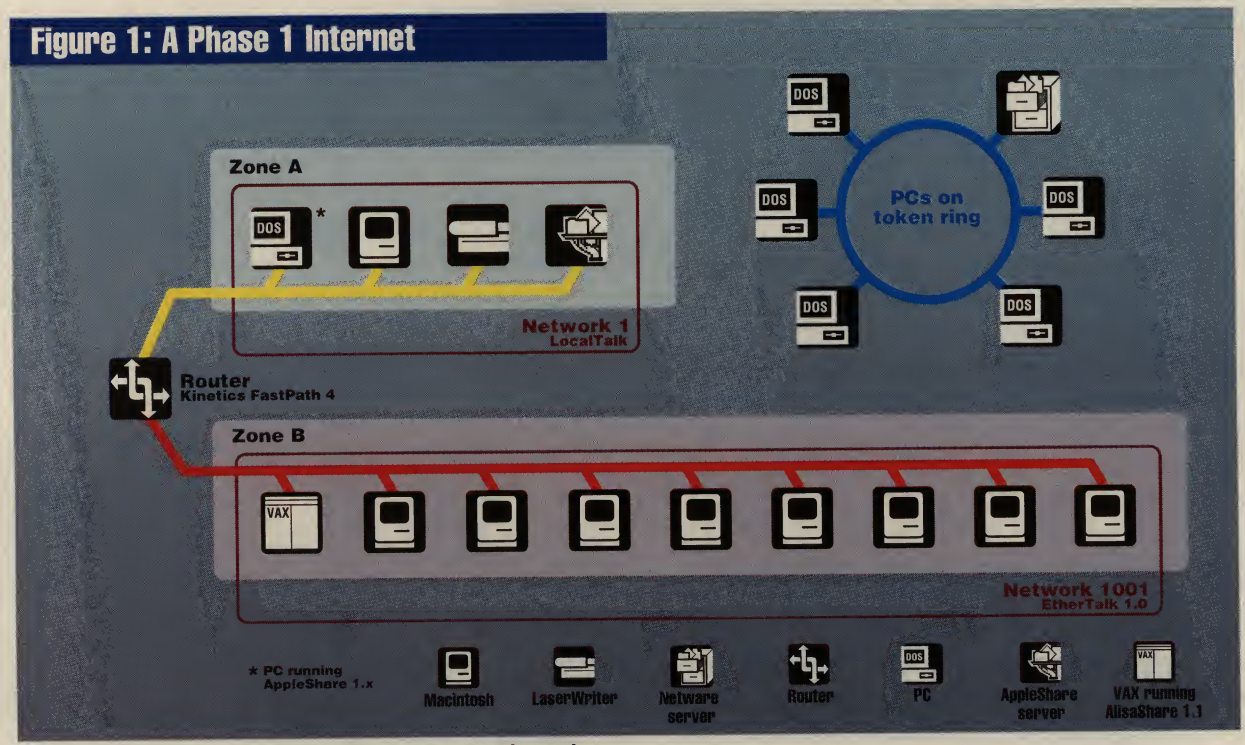
But there were still problems. Network managers wanted to connect Macs to their already existing and very large corporate Ethernet and token-ring networks. Because of its design, however, even EtherTalk would not allow more than 254 devices to be connected to a single network. And although millions of PCs were connected in existing token-ring networks, Macs could not be connected to token rings at all.

These limitations are finally addressed by AppleTalk Phase 2, an upgraded set of AppleTalk protocols. AppleTalk Phase 2 lets Macs connect to token rings, and token rings to AppleTalk internets; it increases the node limit on EtherTalk networks from 254 to more than 16 million; and it improves the routing protocols (which deliver data from one network to another) so they don't create as much network traffic. For information on Apple's Phase 2 products, see the "Apple's Offerings" sidebar.

Phase 2 Addressing

An important change in AppleTalk Phase 2 is a new addressing scheme that

Figure 1: A Phase 1 Internet



ILLUSTRATIONS: MARK W. SWEENEY

An EtherTalk network is assigned a single network number and can contain a maximum of 254 nodes, all nodes in a network must be in the same zone, PCs cannot be AppleTalk nodes on Ethernet networks, and token-ring networks cannot be connected to AppleTalk at all.

shatters Phase 1's limit of 254 nodes. To understand how it does this, let's review AppleTalk addressing. An AppleTalk address has three components: a *node address,* which identifies a specific device on a network; a *network address,* which identifies a specific network on an internet; and a *socket address,* which identifies a specific software process running inside a node. Socket addresses are beyond the scope of this article and are not affected by Phase 2, so I'll focus on node and network addresses.

Each network can support 256 unique node addresses. (Two are reserved, leaving 254 usable addresses for network devices.) A *node* is any device that can originate an AppleTalk data packet. Macintoshes, routers, LaserWriters, NetModems, and AppleShare servers are examples of nodes, as are PCs running AppleShare PC or similar software. Repeaters and StarControllers, which only repeat packets that have originated elsewhere (to prevent signal deterioration), are not nodes and do not have addresses.

A *network* is a group of nodes connected on the same cabling system. If routers are present, they define the boundaries of the networks that make up an internet. In AppleTalk Phase 1 internets, each network cabling system is identified by a single, unique 16-bit network number (see Figure 1).

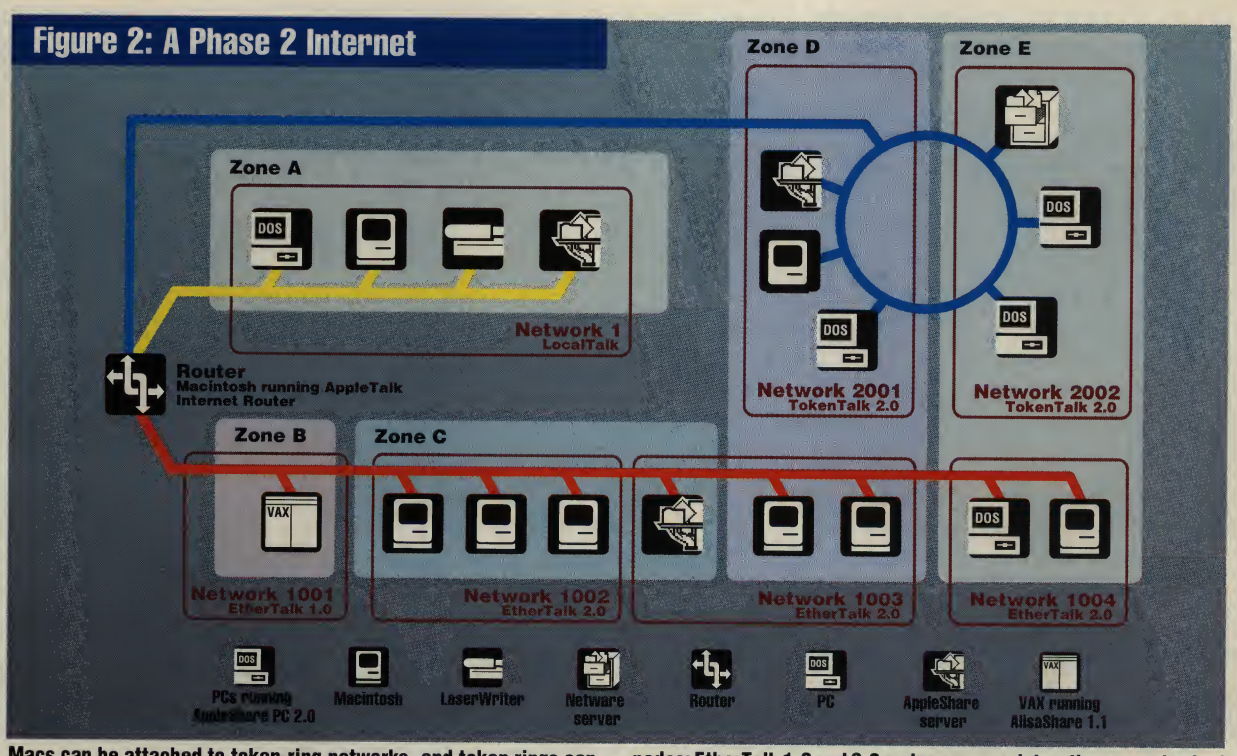
AppleTalk Phase 2 provides *extended addressing* for EtherTalk and TokenTalk networks, which means you can increase the number of devices on a single network. (LocalTalk networks continue to work as they did in Phase 1.) Instead of a network's having only one network number, a network administrator can assign a *range* of network numbers (logical "subnetworks") to a Phase 2 EtherTalk or TokenTalk physical network. Each logical subnetwork can contain up to 253 nodes (see Figure 2). For example, if a Phase 2 network were assigned a range of four logical network numbers, about 1,000 devices could be attached to it. In theory, you could attach up to 16 million nodes to a Phase 2 EtherTalk or TokenTalk network.

The network administrator of a Phase 2 network has much more flexibility in establishing zones than in Phase 1. A *zone* is a grouping of devices on different networks so that they are displayed together in the Chooser. In a Phase 1 internet, each network is, by default, its own zone. A network manager can use router-configuration software to combine two or more networks into a single zone. The networks retain their separate network addresses, but their shareable devices (LaserWriters, servers, and so on) appear together in the Chooser. When networks are combined into zones in a Phase 1 internet, all the devices in the combined networks are assigned to the same zone. But in Phase 2, each *device* on an EtherTalk or TokenTalk network can be assigned individually (see Figure 2).

Phase 2 Routing

Another benefit of AppleTalk Phase 2 is its improved routing protocols, which ensure that devices on different networks can find and communicate with each other. In both Phase 1 and Phase 2 internets, routers exchange data in *RTMP* (Routing Table Maintenance Protocol) *packets.* Every ten seconds, each router broadcasts information about the configuration of the internet. This information is intended primarily for other routers, which use it to update their routing tables, but

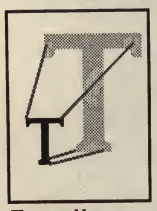
Figure 2: A Phase 2 Internet



Macs can be attached to token-ring networks, and token rings can be attached to AppleTalk internets; PCs can be AppleTalk nodes on Ethernet and token-ring networks; each EtherTalk 2.0 or TokenTalk 2.0 network can be assigned multiple network numbers (logical subnetworks), with each logical subnetwork containing up to 253 nodes; EtherTalk 1.0 and 2.0 nodes can coexist on the same physical cable (but 1.0 nodes must be in a separate logical subnetwork); and different nodes in the same EtherTalk 2.0 or TokenTalk 2.0 subnetwork can be assigned to different zones.

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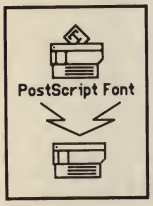
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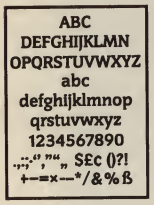
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Apple's Offerings

AppleTalk Phase 2 isn't a product; it's a set of data-communications protocols for AppleTalk networks. Apple is shipping five products that implement the Phase 2 protocols.

AppleTalk Internet Router. This $399 software router, which runs on a Macintosh, is the core product for AppleTalk Phase 2. A router allows two or more networks to be connected to form an internet and manages the flow of traffic between networks. Internet Router software can run either alone on a Mac dedicated as a router or in the background on a Mac being used for other purposes, typically as an AppleShare server.

The Internet Router can connect up to eight LocalTalk, EtherTalk, and TokenTalk networks. Both the printer and modem ports on a Mac can be used to connect LocalTalk networks. (Apple has announced a four-port serial NuBus card, but it cannot yet be used to attach additional LocalTalk networks to a Mac running the Internet Router.) NuBus slots in the Mac II family or the single-card slots in SEs and SE/30s can be used to connect EtherTalk or TokenTalk networks. The Internet Router cannot serve as a half-router for remote dial-in connections. The router contains management software for configuring network numbers and zones, and the AppleTalk Phase 2 Upgrade Utility lets you manage mixed Phase1/Phase 2 internets.

TokenTalk NB Card. This long-awaited NuBus card, based on Apple's intelligent-coprocessor platform, connects Macs to token-ring networks. Token ring is a popular means of networking MS-DOS machines. The TokenTalk card ($1,250) comes with TokenTalk 2.0 software and the SMB File Transfer Utility. TokenTalk lets a Mac use AppleTalk protocols to communicate over a token ring with, for example, an AppleShare server. The file utility provides a means by which a Mac can access SMB file servers on token-ring networks. The TokenTalk card (which has its own 68000 microprocessor) can also be used, when the proper software is downloaded to it, to make 3270-terminal and APPC connections to an IBM mainframe.

EtherTalk 2.0. This new version of the EtherTalk driver, shipping with Apple's EtherTalk NB card, lets a Mac function as a Phase 2 EtherTalk node. A new EtherTalk Card and 2.0 driver cost $699. For those who already have an EtherTalk card and software, all you need to do to upgrade to 2.0 is install and configure the new software. The upgrade is free. If your dealer doesn't have a new disk to trade for your old one, they can tell you where to send for one.

AppleShare PC 2.0. This upgrade enables PCs on Ethernet and token-ring networks to become AppleTalk nodes. Although Apple has supported EtherTalk on the Mac for more than a year, AppleShare PC 1.0 did not allow DOS machines on Ethernet networks to become AppleTalk nodes; it supported only LocalTalk PC connections. Version 2.0 costs $149, but Apple offers the same upgrade policy as for EtherTalk 2.0 if you own version 1.2. The upgrade for version 1.0 or 1.1 costs $50.

Managers of large corporate AppleTalk networks need the benefits of Phase 2 the most, but Apple hasn't even announced **AppleTalk for VMS 3.0,** which will implement the AppleTalk Phase 2 protocols on a VAX running the VMS operating system.

— Henry Bortman

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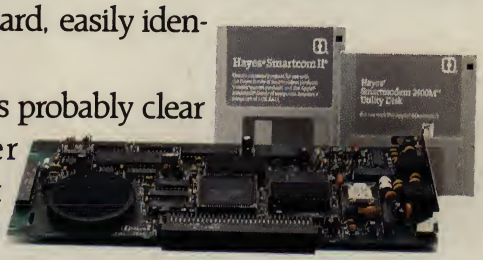
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workstations store a portion of the routing information as well.

What differs between Phase 1 and Phase 2 is how much routing information is stored by routers and how much by workstations. Phase 1 networks have a clear separation of responsibilities between routers and workstation nodes. All routing intelligence is kept in the routers; workstation nodes are dumb. A workstation node keeps in its memory only a small bit of routing information known as an *RTMP stub*. The stub contains two elements: the network number of the node's own network and the node number of the last router that broadcast an RTMP packet on the network.

Each time a router broadcasts routing information, all workstation nodes on the same network update their stubs. When a Mac gets ready to send a data packet, it compares the network number of the packet's destination with its own network number. If the numbers differ, the Mac sends the packet to the router whose node number is recorded in its RTMP stub. The router takes over from there, but there's a catch. Each router sends out information every ten seconds, and all nodes update their stubs each time. So if a Phase 1 network contains more than one router, the node number stored in RTMP stubs is constantly changing.

Consider an AppleShare server, directly connected to an Ethernet backbone, that's being accessed by Macs on several LocalTalk networks. Each LocalTalk network is connected to the backbone via a FastPath router. You send a request through your router (the only one on your network) to the server on the backbone, asking it to send you a file. The most efficient way for the server to get the file back to you is to send it directly back to your router. But the server is on a backbone, which contains several routers.

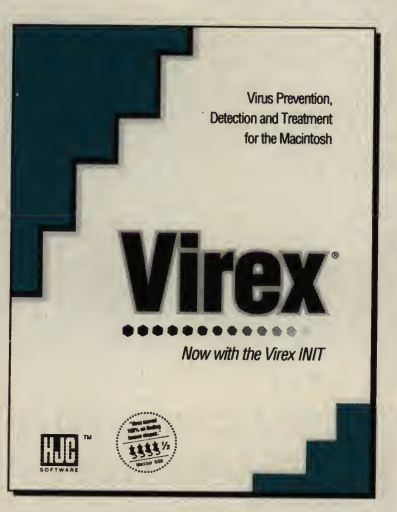
In Phase 1, the server sends the packet to whichever router last broadcast an RTMP packet. If your router wasn't last, the server will first send the packet to another router on the backbone, which in turn will send it to your router, which will then send it to you. Thus, the packet gets sent through the network twice. If you have 20 routers on the backbone, only 1 time in 20 will your packet go directly to your router. The other 19 times, it will go to another router first. As the number of routers increases, the amount of internetwork traffic may be double what is actually necessary to move the data from one network to another.

In AppleTalk Phase 2 networks, each Mac or PC that is connected to a high-speed network (EtherTalk or TokenTalk) keeps a table of which routers are attached to which networks. When a high-speed node receives a packet from a node on a different network, it remembers the node number of the router that sent it the packet. When the server sends a file back to the Mac that requested it, the server doesn't have to rely on chance to send it

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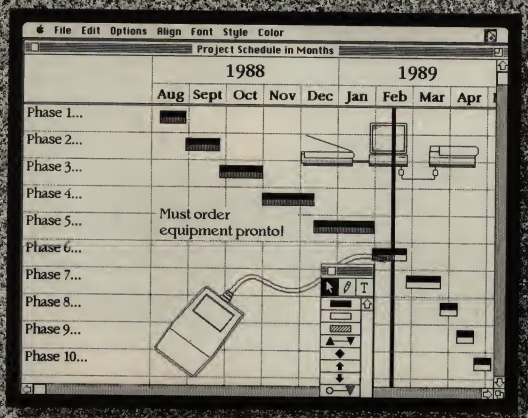
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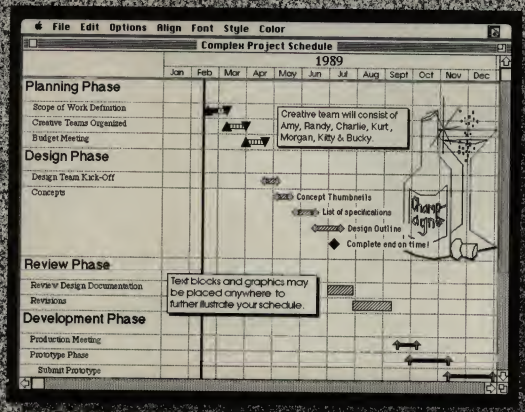


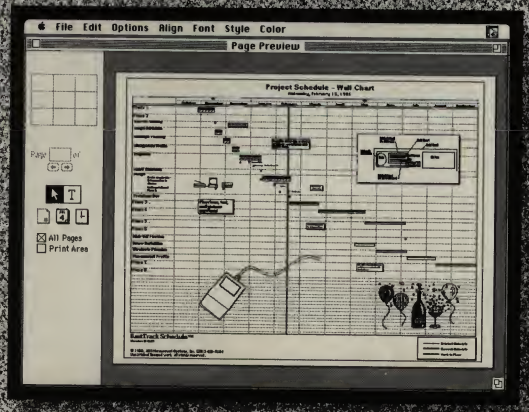
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to the correct router the first time. Instead, it consults its table of router and network associations. By having workstation and server nodes on high-speed Phase 2 networks store more routing information than Phase 1 nodes do, the traffic due to double transmission can be virtually eliminated.

Phase 2 also reduces the size of RTMP packets that routers exchange with each other. Each time a Phase 1 router sends an RTMP packet, it sends out information about all the routers in the internet. Each router adds 3 bytes to the length of these RTMP packets. This problem isn't too great for a 10-router internet, but at somewhere around 50 routers, it becomes noticeable—remember, each router sends an RTMP packet every 10 seconds. At 200 routers, the situation is intolerable.

In Phase 2, using a scheme called *split horizon*, a router tells other routers on only one side of itself about the routers on the *other* side. For example, in a LocalTalk-to-EtherTalk router, the LocalTalk side is informed of the configuration on the EtherTalk side, and vice versa. The improvement is dramatic (see Figure 3).

Should You Upgrade?

If you are using LocalTalk only, Phase 2 offers no advantage, so you won't need to bother upgrading. But if you are anxious to take advantage of EtherTalk 2.0's extended addressing, or to connect Macs to a token ring, you will need to make the leap to Phase 2.

Be forewarned that for most medium and large networks, the migration to Phase 2 will require a considerable amount of logistical planning. Apple has tried hard to keep the network "invisible," but Phase 2 internets are more complex than their Phase 1 predecessors. Even though most vendors of AppleTalk products are bringing their Phase 2 versions to market quickly, if you have a lot of Phase 1 routers or EtherTalk nodes or AppleTalk for VMS on your internet, you will likely have to endure a mixed network while you make the transition. And you will have to manage that transition with care. We'll cover migration strategies in more detail in future issues.

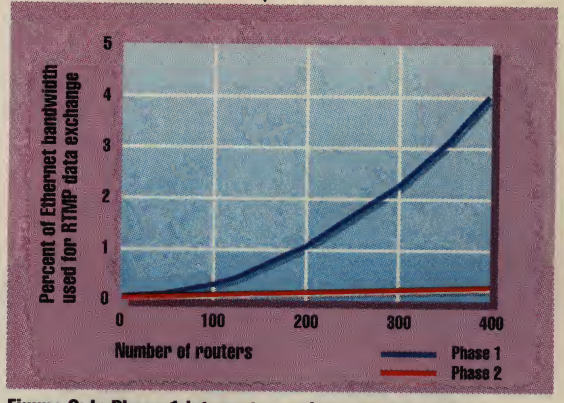
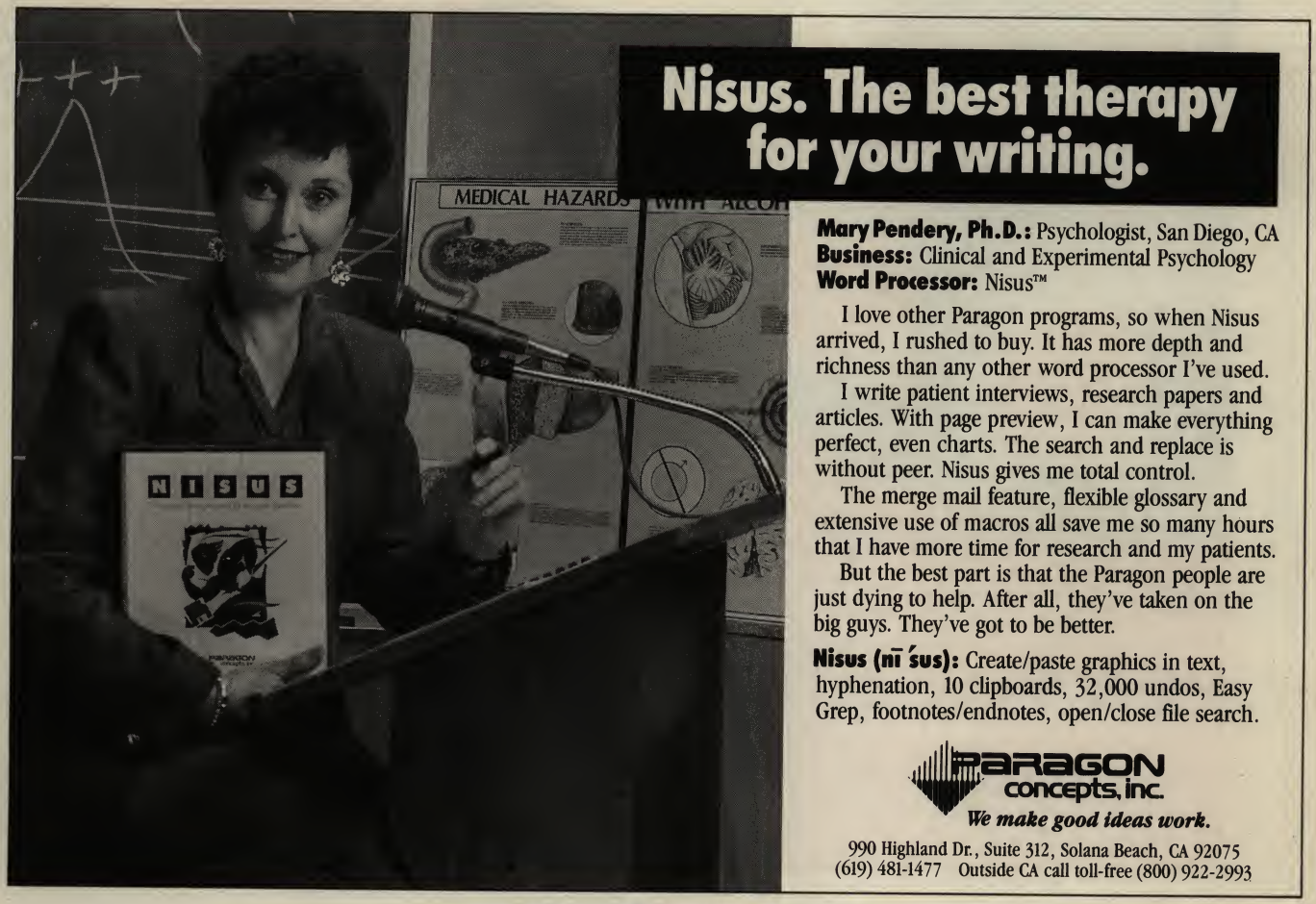


Figure 3: In Phase 1 internets, each router broadcasts its entire routing table (RTMP) every ten seconds, so internets with many routers are swamped by redundant RTMP data. Phase 2 uses a split-horizon technique, which dramatically reduces RTMP traffic.



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- Wild Things 119

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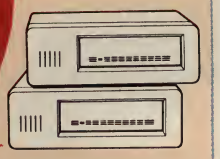
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Bit Pad Plus 12x12 Tablet 349
MacFlip (80 diskettes) 18
Mac 101 Keyboard 149

COMMUNICATIONS SOLUTIONS

- **Software**

LapLink Mac 84
Liaison 174
MacLink Plus 139
MacNet Starter Kit 51
Microphone II 225
Quick Mail (10 Users) 215
Red Ryder 56
Timbuktu 67
TOPS (Mac) 149

- **Hardware**

Abaton InterFAX 329
Anchor 2400 169
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Quark Style..... 189
Read It! (OCR) 260
ReadySetGo! 4.5..... 285
Write Now 2..... 109

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ClickArt EPS Illustrations 75
Canvas 2.0 159
Curator.....75
Digital Darkroom 255
Dreams 279
Freehand.....349
Illustrator '88 Bundle.....289
Image Studio 285
Laser Paint II.....359
MacDraft.....151
MacDraw II 329
Minicad Plus 539
Pixel Paint Professional 439
Smartscrap & The Clipper.....47
Studio 1.....99
Studio 8.....319
Super 3D Enhanced.....331
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Swivel 3D 1.1 325
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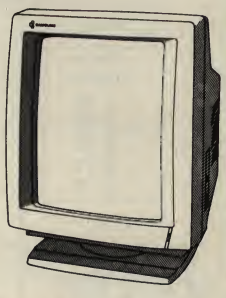
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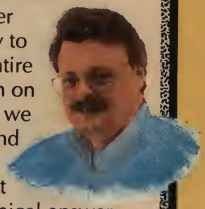
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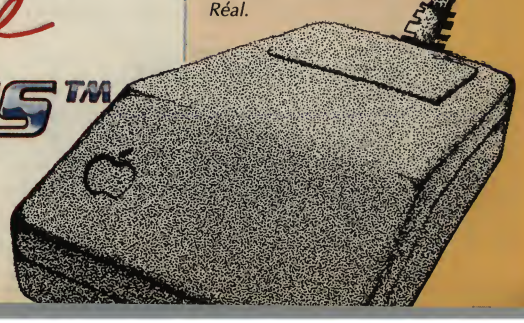
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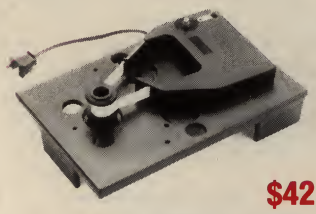
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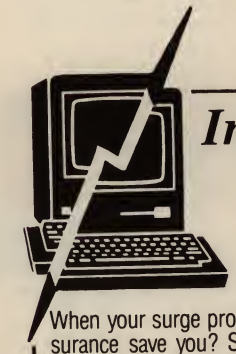
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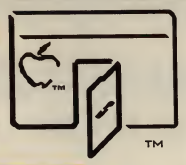
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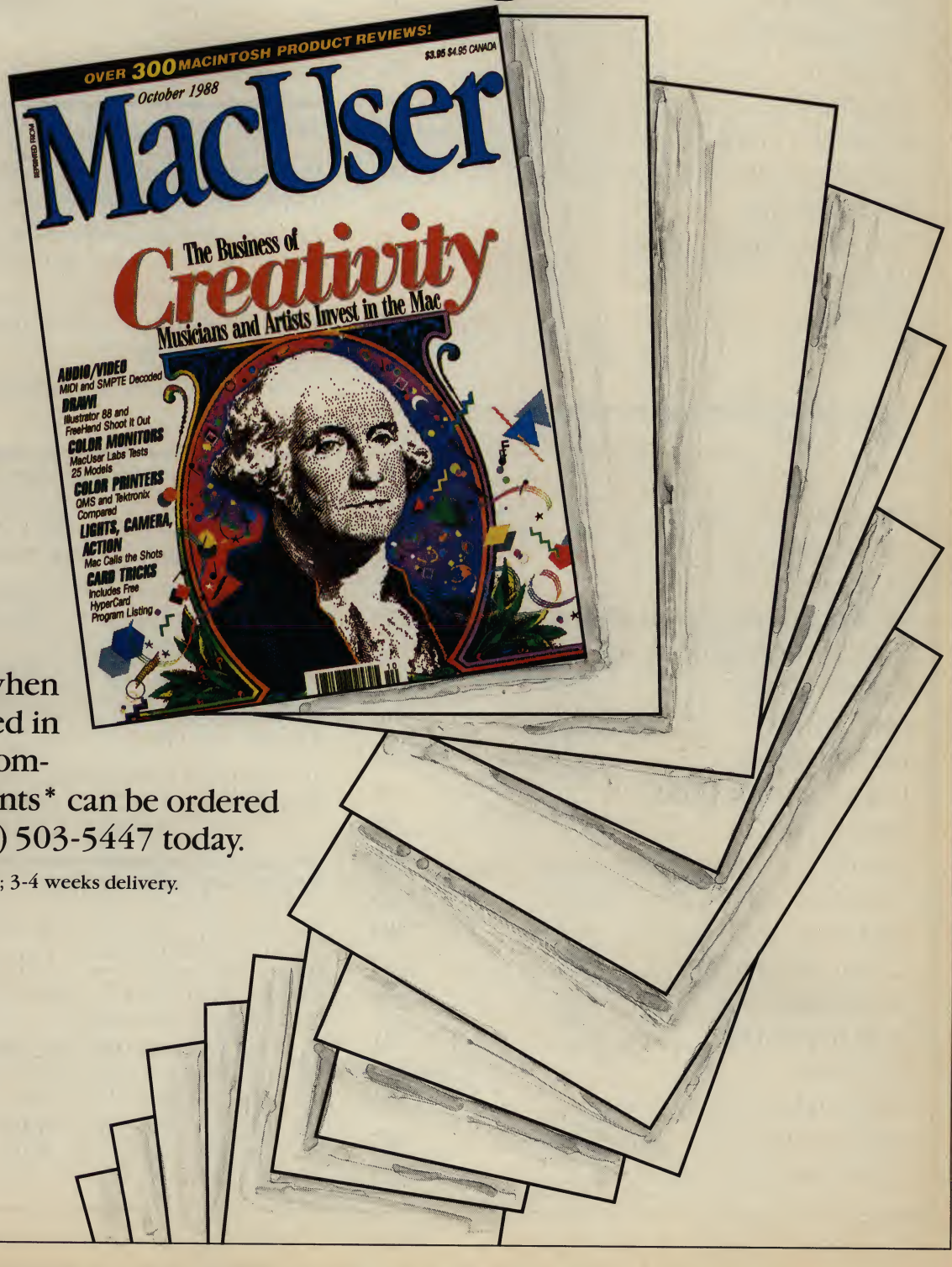
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HARDWARE 271-276

BAR CODE 271
COMPUTER SYSTEMS 271
DATA ACQUISITION 271
DISKETTES 271
DISK DRIVES 272
ENGINEERING 272
GENERAL 272
INSURANCE 272
MEMORY UPGRADES 272-275
NETWORKING 276
PERIPHERALS 276
POWER SUPPLIES 276
PRINTERS 276
SECURITY 276

SOFTWARE 277-282

ACCOUNTING 277
BACK-UP 277
BAR CODE 277
BUSINESS 277
BUSINESS TIME MANAGEMENT 278
DESKTOP PUBLISHING 278
EDUCATIONAL 278
EMULATION 278
ENGINEERING 278-279
ENTERTAINMENT/GAMES 279
FINANCIAL 279
FONTS 279
GENEALOGY 279-280
GRAPHICS 280
LANGUAGE TOOLS 280
MUSIC/MIDI 281
PUBLIC DOMAIN 281
RELIGION 281-282
SHAREWARE 282
STACKWARE 282
STATISTICS 282

MISCELLANEOUS 282-285

ACCESSORIES 282-283
BUSINESS OPPORTUNITIES 283
DATA CONVERSION SERVICES 283-284
DESKTOP PUBLISHING SERVICES 284
INSURANCE 284
MAILING LISTS 284
SUPPLIES 284-285

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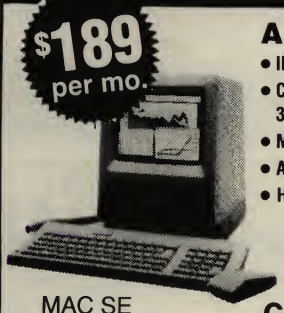
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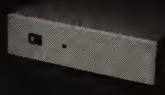
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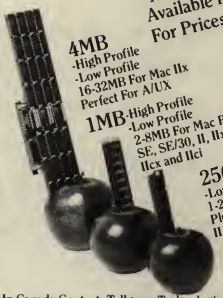
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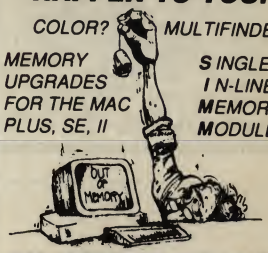
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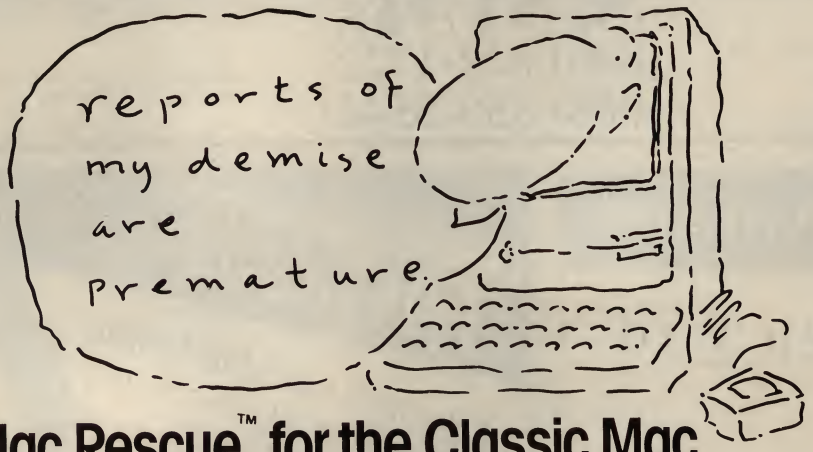


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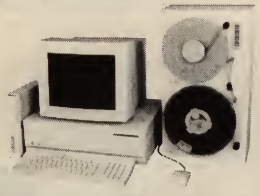
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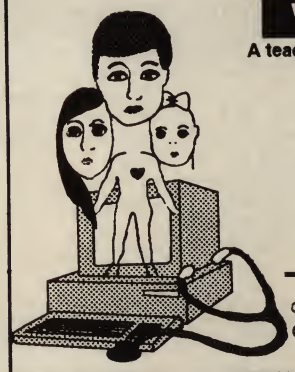


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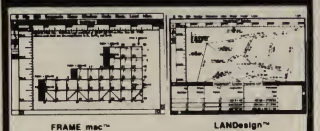
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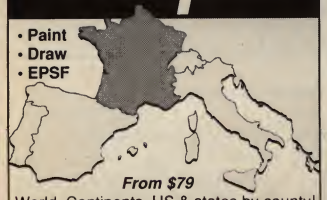
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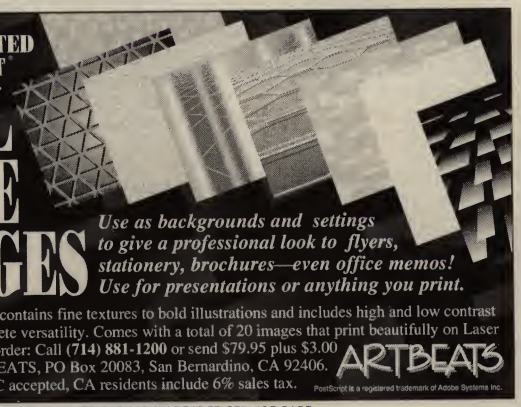
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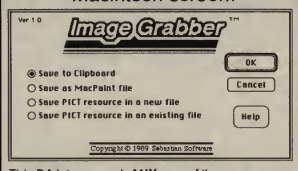
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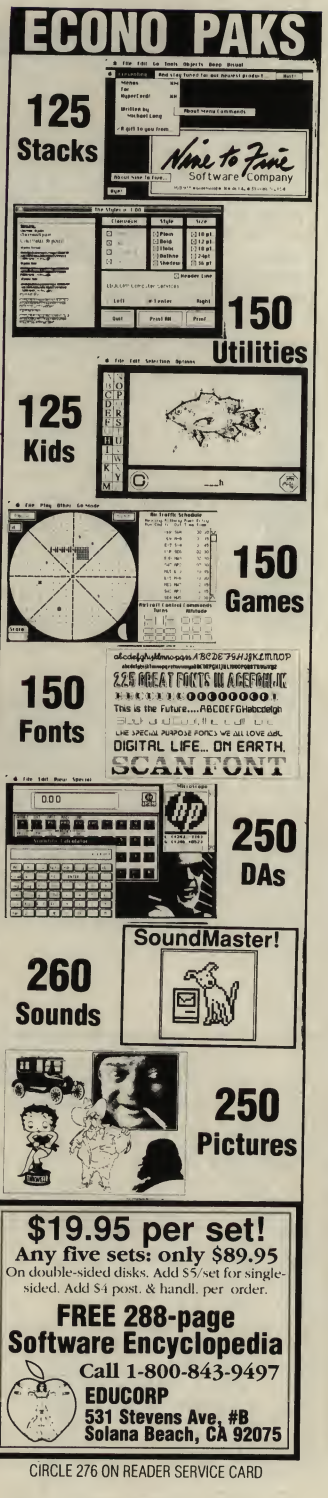


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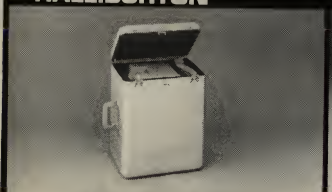
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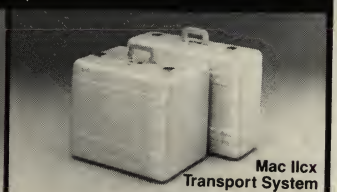
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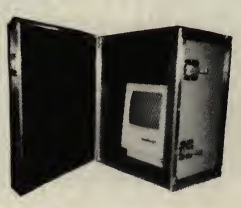


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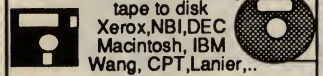
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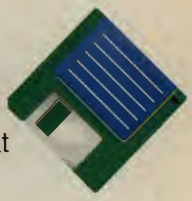
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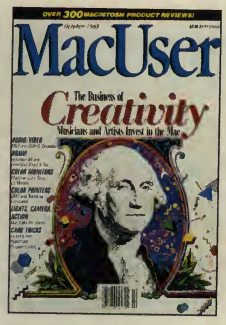
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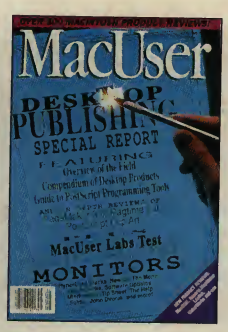
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October '88—The Business of Creativity—A survey of Mac's role in music, art and film; Illustrator 88 and FreeHand 1.0—a detailed comparison; MacUser Lab tests 25 color monitors; Free Hypercard Program listing; Achieve color on screen with QMS ColorScript 100 or Tektronix 4693D; and more.



September '88—Roundup of programs and gadgets that connect Mac's with PCs; Excel, Word, WordPerfect and PageMaker—twin programs for Mac and DOS: Putting Mac and PC on the same page; Toshiba T1000—the ultimate portable; Getting the most out of the fonts you have; In-depth review of FullWrite Professional; and more.



August '88—Tips and tools for desktop publishing; Roundup of EPS clipart collections; PostHaste, Postility, Lasertalk—three new PostScript utilities; PageMaker 3.0 the standard in page layout; Ragtime 2.0, it's even better than its predecessor; MacUser Labs report on biggest monochrome monitors; and more.



July '88—Desktop Engineering, a comprehensive product survey; VersaCad—the ultimate CAD/CAM?; EZ-Mill, computer-aided manufacturing for small machine shops; 54 Mac-compatible plotters—specs, prices, charts; Making your Mac print music; Creating Flowcharts; and more.



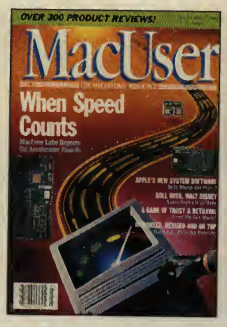
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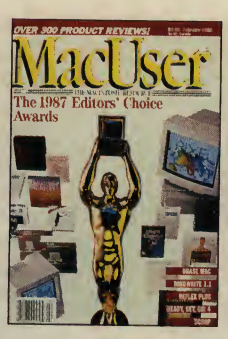
May '88—Apple's new Laserwriter II series—Which is best for you; Interleaf, a multiuser Macintosh II program for high-volume publishing; Pixelpaint—graphics program for Mac II's 16.7 million colors; Workplus Command increases program power and adds new capabilities; How to produce 35mm print slides on Mac; and more.



April '88—Highlights of the San Francisco Macworld Expo; Double Helix review/tutorial; *4th Dimension* power guide; Comparison of MacTeX and TeXtures desktop publishing software; SoundWave and its powerful, easy-to-use sound editing functions; OCR for every scanner; Thunderscan produces high-quality graphics; and more.



March '88—When speed counts—MacUser Labs report on Accelerator Boards for the SE and the Plus; Focal Point and Business Class, two new commercial stacks; Word 3.01 compared to Word 3.0; VideoWorks II—the sequel—gets your Mac pumping; Personal Writer can take you from the (hand) written word to on-screen text; and more.



February '88—The 1987 Editor's Choice Awards for best hardware and software products; MindWrite 1.1 gives you more organizational and editing power; The scoop on **Scoop;** MacCalligraphy—a touch of the Orient for your graphics; ComServe (software) and NetModem (hardware)—two modem-sharing solutions; and more.



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AD INDEX

RS#	ADVERTISER	PAGE
38	911 Graphics, Inc.	250
N/A	Adobe Systems, Inc.	116
N/A	Adobe Systems, Inc.	233
N/A	Adobe Systems, Inc.	164-165
1	AEC Management Systems, Inc.	259
71	ALSoft, Inc.	34
159	Altsys Corporation	206
N/A	Apple Computer, Inc.	100-101
60	Applied Engineering	259
3	Ashlar	48
162	AutoDesk	202-203
4	Automatix	234
74	BASF	210
43	Bitstream	224
175	Casady&Greene, Inc.	141
117	CDA Computer Sales	106
15	Central Point Software	70
N/A	Check Mark Software	175
33	CMS	190
119	CompuServe	297
10	ComputaLabel	148
16	Computer Associates	120
147	Computer Associates	216
36	Computer Friends	268
124	Computer Giftware	30
185	Computer Shoppe	195
138	Datadesk	42
193	DataViz	258
80	Deneba Software	88-89
120	Diskette Connection	234
169	Dr. Mac	263
109	Dubl Click	91
20	E-Machines	9
130	Ehman Engineering	105
131	Ehman Engineering	107
151	Everex Systems, Inc.	251
N/A	Farallon	246-247
167	Fifth Generation	184
164	Fifth Generation	295
24	Fox Software, Inc.	198
199	FWB, Inc.	151
97	GCC Technologies	81
104	GCC Technologies	83
116	GCC Technologies	85
N/A	Geisco	211
N/A	Hard Drives Intl.	220
55	Hayes	254-255
18	Hewlett Packard	129-131
90	HJC Software, Inc.	257
154	Innovative Data Design	178-179
197	Informix Software, Inc.	138-139
111	Infosphere, Inc.	253
69	Insight Development	204
22	Insignia	205
77	iDS Systems, Inc.	38
25	Intergraph	194
N/A	Intuit	45
113	IPT	21
59	James River Corporation	243
58	Jasmine Technologies, Inc.	64-65
62,63	JDR Microdevices	124
144	Kensington	118-119
26	Kent Marsh	182
11	Keytronic	113
177	Kurta	174
75	LaCie	135
76	LaCie	137
181	Laser Connection	218
106	Layered, Inc.	235
88	Liberty Systems	70
82	Linotype	230
34	MacAcademy	32
N/A	Mac Connection	10-19
89	Mac Friends	69
85	Mac Friends	71
84	Mac Friends	195
73	Mac Friends	229
121	Mac in Stock	28
50	MacLand	264-265
28	MacProducts USA	160-161
123	MACsetra	90
165	Mac Store	268
N/A	MacZone	142-147
31	MacWarehouse	51-59
54	Magna	180
13	Mainstay	192
184	Mass Micro	C3
187	MathSoft	196
115	Maxell	260
23	Maxcess	38
152	MBS. Inc	266-267
N/A	MECA	125-127
51	Merritt Computer	149
198	Microcom	154-155
61	Microleague Sports	149
81	Micron Technology	66
182	MicroNet	171
183	MicroNet	208
114	Micro Planning	299
N/A	Microsoft	122-123
N/A	Microsoft	94-95
N/A	Microsoft	C2-1
134	Microtech International	186-187
83	Mirror Technologies	152-153
100	Monogram	31
40	Mouse Systems Corporation	236
N/A	NEC	92A-D
157	NEC	40-41
37	Novell-Fastpath	252
102	Nuvotech	244
137	Odesta	22
136	Odesta	170
86	Olduvai	176
87	Olduvai	177
64	Optimal Technology	87
N/A	Oracle	7
17	Orange Micro	35
14	Orange Micro	6
78	Paracomp, Inc.	109
79	Paracomp, Inc.	111
107	Paragon	261
39	Pairs Software	228
48	Peripheral Land, Inc.	181
47	Peripheral Land, Inc.	237
68	Personal Training	86
30	Pinnacle Micro	92
72	Programs Plus	72-79
188	Prometheus Products	112
178	Qume	214
179	Qume	214
141	Radius	24-25
N/A	Raster Ops	102
12	S.P.S.S.	212
150	Safeware	268
160	Sharp Electronics Corp.	44
191	Shiva	256
27	Sigma	29
112	Sensible Software, Inc.	20
170	Silicon Beach	227
6	SmethersBarnes	108
65	Software Ventures	36
163	Solutions International.	240-241
127	Specialty Software Development	288
2	Springboard Software	239
158	STF Technologies	200
19	Summas	150
44,94	SuperMac Technology	217
45,95	SuperMac Technology	219
46,96	SuperMac Technology	221
42,41	SuperMac Technology	39
66,67	SuperMac	C4
92	Symantec	23
93	Symantec	172-173
148	Synergy	228
171	Tektronix	242
129	TENPointO	98
195	Thunderware	68
29	T/Maker	26
122	Timeworks	222
N/A	TOPS	5
56	Zipatone, Inc.	250

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031 032 033 034 035 036 037 038 039 040	041 042 043 044 045 046 047 048 049 050	051 052 053 054 055 056 057 058 059 060
061 062 063 064 065 066 067 068 069 070	071 072 073 074 075 076 077 078 079 080	081 082 083 084 085 086 087 088 089 090
091 092 093 094 095 096 097 098 099 100	101 102 103 104 105 106 107 108 109 110	111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130	131 132 133 134 135 136 137 138 139 140	141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160	161 162 163 164 165 166 167 168 169 170	171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190	191 192 193 194 195 196 197 198 199 200	201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220	221 222 223 224 225 226 227 228 229 230	231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250	251 252 253 254 255 256 257 258 259 260	261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280	281 282 283 284 285 286 287 288 289 290	291 292 293 294 295 296 297 298 299 300

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031 032 033 034 035 036 037 038 039 040	041 042 043 044 045 046 047 048 049 050	051 052 053 054 055 056 057 058 059 060
061 062 063 064 065 066 067 068 069 070	071 072 073 074 075 076 077 078 079 080	081 082 083 084 085 086 087 088 089 090
091 092 093 094 095 096 097 098 099 100	101 102 103 104 105 106 107 108 109 110	111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130	131 132 133 134 135 136 137 138 139 140	141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160	161 162 163 164 165 166 167 168 169 170	171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190	191 192 193 194 195 196 197 198 199 200	201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220	221 222 223 224 225 226 227 228 229 230	231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250	251 252 253 254 255 256 257 258 259 260	261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280	281 282 283 284 285 286 287 288 289 290	291 292 293 294 295 296 297 298 299 300

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031 032 033 034 035 036 037 038 039 040	041 042 043 044 045 046 047 048 049 050	051 052 053 054 055 056 057 058 059 060
061 062 063 064 065 066 067 068 069 070	071 072 073 074 075 076 077 078 079 080	081 082 083 084 085 086 087 088 089 090
091 092 093 094 095 096 097 098 099 100	101 102 103 104 105 106 107 108 109 110	111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130	131 132 133 134 135 136 137 138 139 140	141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160	161 162 163 164 165 166 167 168 169 170	171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190	191 192 193 194 195 196 197 198 199 200	201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220	221 222 223 224 225 226 227 228 229 230	231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250	251 252 253 254 255 256 257 258 259 260	261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280	281 282 283 284 285 286 287 288 289 290	291 292 293 294 295 296 297 298 299 300

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Mr. Forrest Jerome, Director of Product Development Systems, Colgate-Palmolive

"MacUser helps us identify and evaluate the product features that are important to our business."

Forrest Jerome
Director of Product Development Systems
Colgate-Palmolive

As Director of Product Development Systems, Forrest Jerome helped bring the first microcomputers into Colgate-Palmolive.

"We were one of the earliest companies to adopt the Macintosh," Jerome remembers. "Originally, we bought them just for senior management. Now, almost five years later, the Macintosh is part of Colgate's standard hardware platform."

Jerome views the Mac as an indispensable tool. "It gives people in our company the ability and confidence to make a difference. I call it 'individual innovation.' Individuals throughout the company are discovering that the Mac changes their jobs in many small ways—ways that add up to a substantial competitive advantage for the entire corporation.

There's another tool Forrest Jerome finds indispensable—MacUser magazine.

"Our Information Technology Group makes hardware and software recommendations that affect the entire company. But we can't possibly do an in-depth evaluation of every product out there. That's why we depend on MacUser to give us the information we need.

"The comparative product reviews are probably most important to me—though, actually, it's all important, from the features to the advertising. MacUser tests and reviews every available product in a given category, to make sure we don't miss anything. I count on the Lab Reports to tell me what works and what doesn't, and to help me identify the features that would mean the most to Colgate's business. MacUser helps us understand how useful the product will be once it's installed in our offices around the country."

Rigorous, thorough tests from the best lab in the industry. Credible, easy-to-read editorial content. That's why Forrest Jerome—and 300,000 other Macintosh business buyers—make more buying decisions with MacUser than any other Macintosh magazine.

Contact: Jeff Miller, Publisher
(415) 378-5601

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Bobker's Dozen

Good Things and Small Packages

Another month, another carton of programs to try out. Some of the programs on these pages are freeware or shareware. They are available only from user groups, electronic services, and/or bulletin boards. Shareware authors generally have no resources and less time. We usually don't print their phone numbers; don't look a number up and call it if it's not listed here. In some cases, we don't even print a mailing address. If an address is listed and you write for information, enclose a self-addressed, stamped envelope if you expect a reply.

Write to

Bobker's Dozen, c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404

Do you have a good thing in a small package? If you'd like to have it considered for review here, send it to the address above.

By Steven Bobker

1 SuperGlue II ..... ★★★★★

Long ago (1986) and far away, a unique and useful program came from Solutions International in the wilds of Vermont. The program was Glue, a small gem that allowed users to capture documents to disk, with their graphic images in a standard format. Others could view the files by using a special viewing application or DA, both of which came with the package. Glue rapidly became a standard. It reemerged two years later as SuperGlue — revised, added to, and generally much improved. Now Solutions has released the third generation of Glue, SuperGlue II. This program, with its added features, is clearly at the top of its category. It's also the best new program I've seen in the last 31 days.



ILLUSTRATION: MARK W. SWEENEY

The most significant new feature, at least to me, is the One-Timer Fkey, which improves the image-saving function by at least 50 percent. Now only one trip to the Chooser is needed per image, and the Fkey also pulls up the Chooser for you, saving more time. Another great new feature is Glue Notes, text notes that can be attached to any place on an image file and hidden when not in use. They can be printed out along with the image and a key to the notes.

SuperGlue II does far more than merely print to disk. It saves files in its native format, PICT; as Scrapbook files; and as text. And, yes, it can extract text and numbers from images for use in word processors and spreadsheets. Getting used to the many features in SuperGlue II takes some time and effort, but you'll benefit from doing so.

$119.95. Solutions International, 30 Commerce St., Williston, VT 05495; (802) 658-5506.

2 TopDown ..... ★★★★½

Kaetron's wonderful, versatile planning tool, TopDown, can make every user a better planner. The program offers elegant tools that easily create organizational and work-flow charts, procedure diagrams, business plans, flowcharts (traditional and free-form), and graphic outlines.

TopDown's basic graphic orientation is hierarchical, so levels of detail that do not need to be seen can be hidden yet easily accessible (generally by double-clicking). Note cards can be attached to any specific part of a document, and user-drawn icons help make things attractive and clear. The Help file is one of the best designed and most useful I've ever seen.

Overall, the design is slick and the execution excellent, although creating nice output can take a bit of work and some functions are less than immediately obvious. TopDown is the kind of program in which an organized person will want to spend most of the working day.

$249. Kaetron, 11318 Ericston Drive, Houston, TX 77070; (713) 320-0278.

3 MugShot Deluxe

Good news follow-up: Two months ago, I mentioned a small freeware program called MugShot. At that time, I was unaware of the author's plans for this neat little gem.

MugShot is near the end of its transformation into MugShot Deluxe (MSD), a commercial program with the bells and whistles and polish that you expect from an author who is asking you to lay out cash in advance.



Take my word on this: If you care about what's actually happening inside your Macintosh (I realize that many of you are more interested in the results than the process, but I've always been process-oriented) and what's doing it, get MugShot Deluxe. It's a slick, useful program. If you beta-test software — or wonder what two (or three or four) INITs might have caused that new megabucks presentation program to crash — check things out with MSD. Even in its current late-beta version, it's on my Indispensible-in-an-Emergency floppy, which stays taped to the side (away from the power supply) of my Mac.

No firm price yet. Mi Concepts, P.O. Box 8822, Kentwood, MI 49508.

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It's sad but true. All it takes is a few minutes with your back turned, and an intruder could walk away with your most confidential data. *And you'd never even know it!*

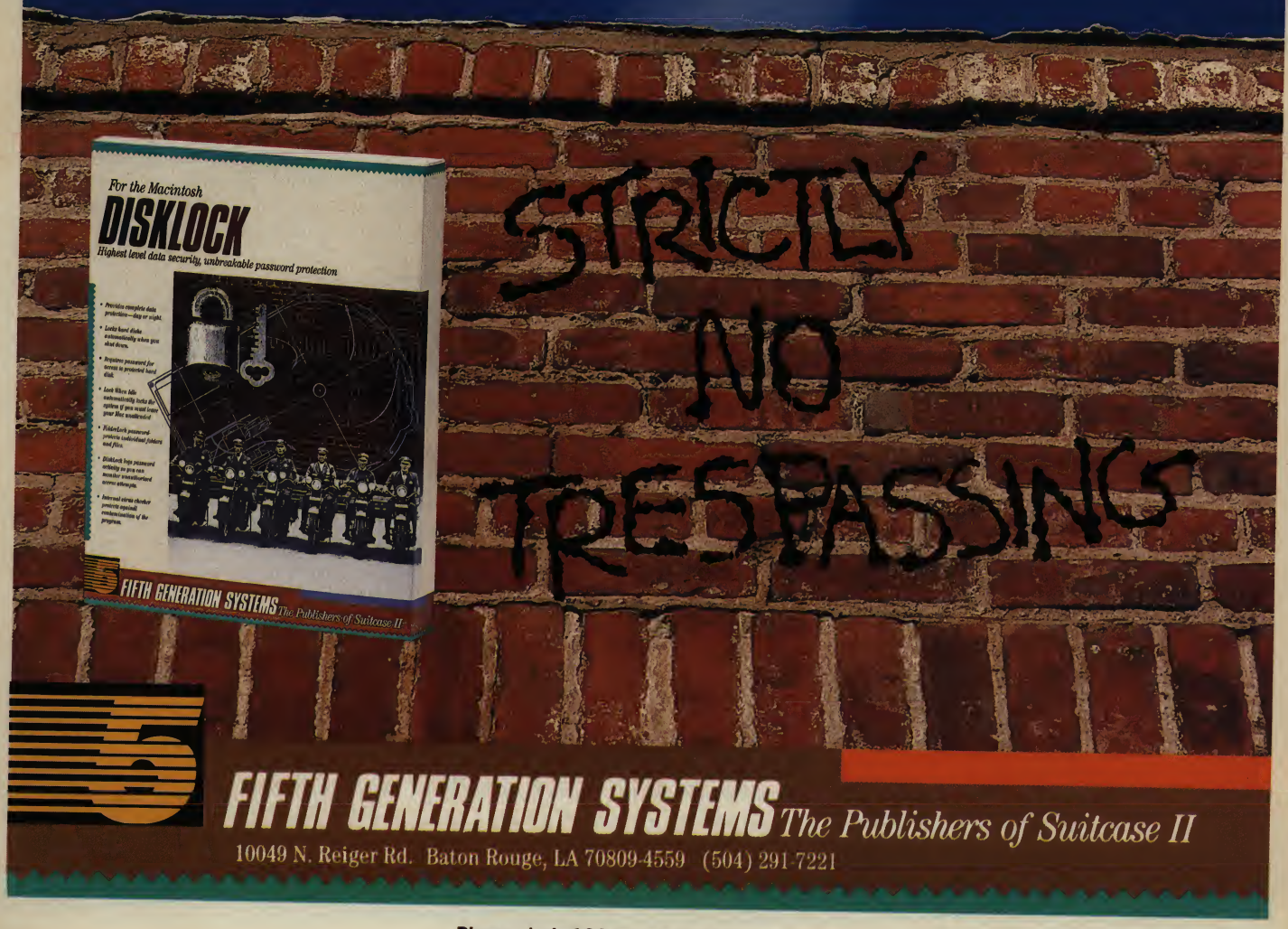
Now the leader in hard disk security announces the ultimate data protection system for your Macintosh. **DiskLock** works with any SCSI hard disk to provide foolproof password protection for individual files, folders, or your entire hard disk. You can even protect *all three levels* with different passwords for absolute maximum security. **DiskLock** automatically locks your files when you shut down or leave your Mac unattended, and alerts you to any unauthorized access attempts.

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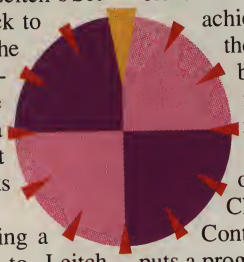
FIFTH GENERATION SYSTEMS *The Publishers of Suitcase II*

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4 Set Clock ★★★★½

Two handy tools can help you keep track of time. The first is Jim Leitch's Set Clock. It sets the Mac's clock to within one-second accuracy. The clocks in the Mac are silicon-chip–based; some of them are clunkers that lose or gain a second or two per week. Set Clock keeps all Mac clocks equal and accurate.



Set Clock works by placing a ten-second telephone call to Leitch Video's master clock driver, which constantly synchronizes itself (to within one-millisecond accuracy) with an identical unit maintained by the Canadian government that is referenced to an atomic standard. In other words, it's very exact. You need a modem (300 bps will do) that can deal with a basic Hayes command set. The phone numbers are provided primarily for Leitch Video customers whose equipment must be precisely calibrated, but Set Clock gives you access to them at no cost beyond the tariff for the phone calls (about 20¢, if you call at night).

Free (available from electronic services, bulletin boards, and user groups). Leitch Video International, 10 Dyas Road, Don Mills, Ontario M3B 1V5, Canada.

5 SuperClock! ★★★★★

Productivity can be defined as the efficient and profitable use of time. To achieve it, you need to be aware of the current time, and you must be able to set your time-keeping devices to match a recognized standard.

The other utility in this pair of Mac time programs, Steve Christensen's SuperClock!, is a Control Panel device, or cdev, that puts a programmable time display at the right end of the menu bar. It is by no means the first program of its kind, but it is by far the best behaved, existing peacefully in all sorts of strange environments and avoiding conflict with INITs and other cdevs.

The display, which can be turned on and off, can appear in any size of any currently loaded font. The latest version includes versatile timer and alarm functions. Both SuperClock! and Set Clock are free, although copyrights and other rights are retained by the authors. Indeed, SuperClock!'s major drawback is that there always seems to be a new, slightly better, but still free, version to upgrade to.

Free (available from electronic services, bulletin boards, and user groups only). Steve Christensen, CompuServe: 76174,1712; AppleLink: Christense1.

6 GOfer ★★★★½

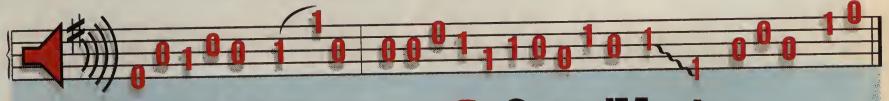
If you know you wrote a memo discussing widget sales months ago but can't remember in which of hundreds of cryptically named documents this information resides, you've got a problem. Fortunately, Microlytics has come up with a solution: a nifty DA that lets you find the electronic equivalent of a needle in a haystack without digging into every haystack individually.

GOfer was one of the first DAs that could search through all the text on a hard disk looking for text strings as well as filenames. Boolean searches on multiple criteria were also possible, and GOfer worked in both the background and the foreground, which was necessary because search speed was a little less than a megabyte a minute.

Now there's a new version (2.0) of GOfer. Its feature set is not much different from version 1.0, but its performance has been greatly improved. The complex interface has been simplified a bit and is now far more intuitive, with powerful new search options. Search speed has also been noticeably increased.

I don't use search programs like this as much as I thought I would before I got one, but sometimes having one on call is vital. With this new release, GOfer has moved to the head of its class.

$79.95. Microlytics, Two Tobey Village Office Park, Pittsford, NY 14534; (716) 248-9150.



7 Sound Manager Package ★★★★½

The Mac's ability to use sound has interested users from the earliest days. Two of today's best sound manipulators are shareware. Although some features overlap, serious soundophiles will want both. The suggested donation for both programs is $30.

The first is Sound Manager Package from Ettore Software. Sound Manager's interface looks and works a lot like Font/DA Mover's, moving sounds into Sound suitcases. It can also play sounds and do some light editing. Mac sound resources and files come in several incompatible formats, as anyone who has ever tried to manipulate them quickly has discovered. Sound Manager can read all the formats and can do almost any necessary conversion. That alone is worth the price of admission.

Included in the package are small INITs that play a sound at startup, at shutdown, and when something is thrown into the trash. There's also a program that lets Plus and SE users who are still using System Update 5.0 have custom System beeps.

$20 shareware fee. Ettore Software, 67 Rue de la Limite, 1970 W-Oppem, Belgium; phone 011-322-2355978. Include an International Reply Coupon with all information requests.

8 SoundMaster ★★★★½

Bruce Tomlin's SoundMaster is a feature-laden INIT-cdev that lets you assign any SoundWave-, SoundCap-, or MacRecorder-created sound to such things as startup, shutdown, restart, disk insertion and ejection, the System beep, key clicks, and the space bar and Return key. SoundMaster has adequate built-in documentation and keeps track of the amount of memory assigned sounds use (that's important). Each sound can have a different volume, and all sounds can be played from within SoundMaster.

Drawbacks are few. SoundMaster doesn't handle the snd resources that Sound Manager does, and you need to be careful when running MultiFinder, as memory problems can arise suddenly.

$10 shareware fee. Bruce Tomlin, 15801 Chase Hill Blvd., #109, San Antonio, TX 78256.

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9 Exstatix ..... $4\frac{1}{2}$

Select MicroSystems' imaginatively named Exstatix is a high-quality statistics program with a few unexpected extras. The most important is its extensibility. Exstatix is built to easily integrate plug-in modules written in a high-level language. Thus, there is virtually no statistical function that Exstatix can't handle. It might not be easy, but the job can always be done.

Other Exstatix strengths include excellent graphing, color support, and decent calculation speed. Although it's not the speed champion among Mac stats programs (the StatView family seems to have that distinction wrapped up), it is a respectable performer, outpacing the other stats program covered here this month, Fastat.

Data-entry ease is average — no stats program is really great at data entry. The documentation is extensive — as it must be for a program this complex — and very well written. The more statistically adept will find this an easy program to get acquainted with, and programming statisticians will find it an absolute delight.

$349. Select MicroSystems, 322 Underhill Ave., Yorktown Heights, NY 10598; (914) 245-4670.

10 Fastat ..... $3\frac{1}{2}$

Fastat offers a subset of the feature set of the most feature-laden Mac statistics package, Systat. More importantly, it costs a third as much and replaces Systat's outdated command-line interface with a decent Mac interface. Data entry, which uses the same spreadsheetlike model all stats programs seem to favor, is of average ease. The documentation is adequate but uninspired. The range of possible analyses will satisfy all but the most demanding statisticians.

Fastat is easy to learn, especially when compared with Systat. It's good at data analysis and range testing and can display results graphically as well as numerically. The graphing abilities, although adequate for most services, are not of presentation quality and can be difficult to manipulate.

Fastat is slower than Exstatix and every other roughly comparable program. That, apparently, is the cost of imposing a Mac interface on Systat. Still, unless your demands are extreme, Fastat's speed should prove acceptable.

I liked this program more than this recitation of pros, cons, and details seems to imply. It has a pleasant working feel and, given its power, is light on the wallet.

$195. Systat, 1800 Sherman Ave., Evanston, IL 60201; (312) 864-5670.

11 Ft. Knox ..... $4\frac{1}{2}$

Ensuring microcomputer data security is a thorny problem; there are no sure solutions. Files can be encrypted with essentially unbreakable algorithms, but encoding and decoding are slow and entail a slight risk of corruption and irrecoverable data. That does not mean you should throw your hands up and ignore the problem, though.



ILLUSTRATION: K. DANIEL CLARK

I prefer common-sense solutions, but sometimes software help is valuable. Ft. Knox, from Transfinite Systems, is an excellent security utility. It doesn't pretend to lock up files and volumes, since most locking schemes can be readily bypassed or broken. It does offer some powerful encryption schemes, including a nice implementation of the DES encryption algorithm. (DES, which stands for data encryption standard, is a widely used high-level security cryptographic protocol supported by the National Bureau of Standards and other government agencies.) Encryption and decryption are relatively fast.

Ft. Knox also lets you check various drives and volumes for errors and can access SCSI devices at their most primitive levels. Files and volumes can be deleted, overwritten for security, or "sanitized" to meet U.S. national standards for declassifying top-secret information. If you compete for government contracts that involve classified materials, software such as this is mandatory.

Ft. Knox has proven stable and reliable and does exactly what it claims to do. The manual frequently runs to overbearing prose, but it contains excellent information. This is a well-designed, intelligent, and — most importantly — useful security package.

$195. Transfinite Systems Co., P.O. Box N, MIT Branch Post Office, Cambridge, MA 02139-0903; (617) 969-9570.

12 MacInvoice ..... $3\frac{1}{2}$

MacInvoice is a simple invoice creator that prints very well and handles basic chores with no fuss. If you need an invoice that involves fancy graphics and fonts, MacInvoice is not the program for you. But if your income depends on getting lots of invoices out, MacInvoice will do the job for you quickly and handsomely.

MacInvoice also saves the invoice data and can print a summary journal. Its sole invoice form can be edited to suit virtually every user. A limited macro ability helps speed data entry. MacInvoice is an excellent solution to a common small-business need.

$69.95. Synex, 692 Tenth St., Brooklyn, NY 11215; (718) 499-6293.

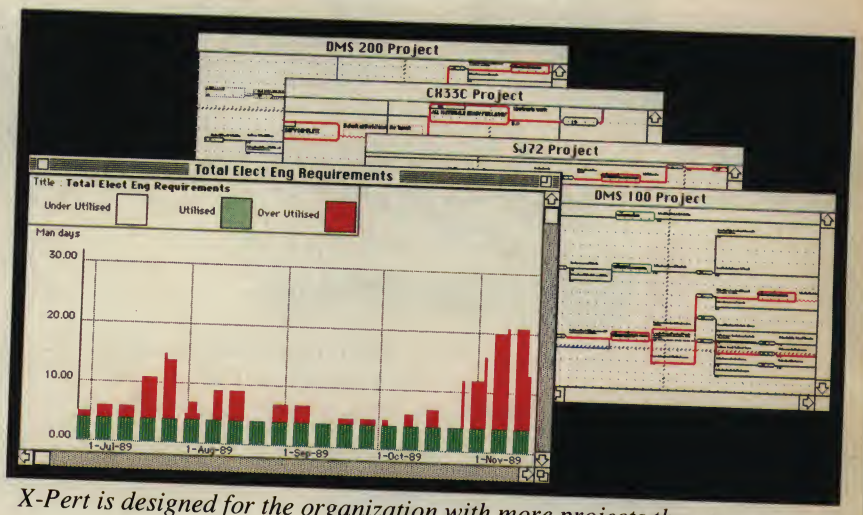
13 Word Wrapper ..... $3\frac{1}{2}$

Word Wrapper's sole purpose is to break the lines — to your specifications — of text files received by or to be sent by modem. Other programs do similar work, but they bury this function so deeply that it can be hard to find. Word Wrapper comes as both an application (for MultiFinder users) and a DA (for everyone else). The only difference between the two versions is that the application has a brief built-in Help file. In this age of feature overload, a small program such as this that identifies a need and solves it elegantly is like a breath of fresh air. Word Wrapper qualifies as a cooling breeze. And, as the program declares when it finishes wrapping another file, "That about wraps it up."

$29.95. International Technology Development Corp., 1990 Lombard St., #250, San Francisco, CA 94123-2807; (415) 929-0924.

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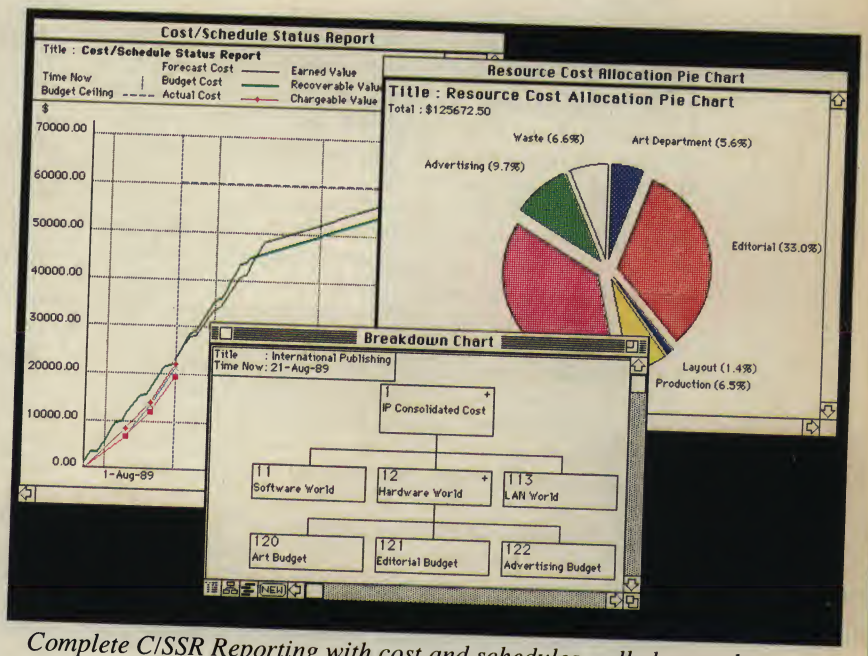
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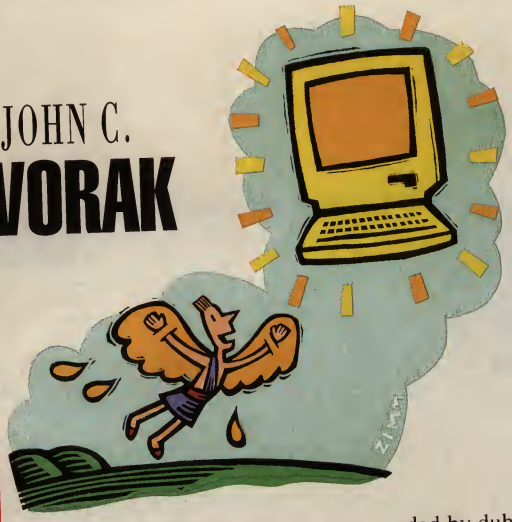
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JOHN C.

DVORAK



If there has ever been a computer surrounded by dubious mystique, it's the Macintosh. In this month's column, I've managed to isolate the top-ten current misconceptions about the Macintosh.

Myths Taken

Myth #1: *The Mac is a general-purpose business computer and not a niche machine.*

Yeah, right. Get real. The Mac is anything *but* a general-purpose machine designed for boring data entry in a multiuser business environment. Mac marketeers and other promoters know that there is a lot of money to be made in this dull arena. So what? This arena is a niche unto itself, better filled by cheap IBM PC clones and terminals.

The Macintosh is the prestige machine. The executive machine. The machine for those who want to be on the cutting edge. It's a machine for the art department, the desktop-publishing front end, the creative people. To use a computer like this for mundane tasks like order entry and invoicing is stupid and a waste of money.

Myth #2: *Apple has lost its technological edge.*

I keep hearing this, and everyone blames John Sculley. Sculley is a dud compared with good old Steve Jobs, say the critics. These same critics, years earlier, were saying that Jobs was a dud compared with good old Steve Wozniak. Maybe all these guys are duds, OK?

In fact, Apple can just let the microprocessor chips get faster, and the machine will get more and more functional on its own. Apple is surfing the technology wave; there's a big wave coming in, and Apple's in a perfect position for a long ride.

Myth #3: *The IBM world is catching up; soon there will be no difference between a PC and a Mac.*

This idea comes from naive PC users who have never used a Macintosh and from dopey Mac users who believe everything the naive PC users say.

Reality check: Only in a crude sense has the PC world approached the Macintosh. Real diehard PC users (including the Windows fiends) still avoid the mouse and are genuine keyboard fanatics. The Macintosh completely baffles them. Folks, these two worlds will never collide.

Myth #4: *Mac developers are poised to jump into the DOS world when OS/2 takes off.*

The intellectual investment needed to learn the OS/2-Windows environment and the intellectual investment needed to learn the Mac are too intense for the same person to commit to both environments. Therefore, to move from one camp to the other means hiring specialists who do these so-called ports. The developers themselves never change sides. Once a Macintosh developer, always a Macintosh developer. The same is true with the PC crowd. Nobody changes sides; they just moan and groan.

Myth #5: *The Mac isn't a game machine.*

Anyone who plays games knows that the Mac is a great game (and educational!) computer. Too bad Apple promotes the order-entry/invoicing/business side of the machine, as cited above.

Myth #6: *The Mac could be sold cheaper; there should be a low-end Mac.*

Well, maybe it could be sold cheaper if you wanted to lowball the machine for no particular reason. But it's not as though the company has to knock off a competitor. Actually, Apple is run as a quality company with every intention of being in business a hundred years from now.

There doesn't need to be a low-end Macintosh as long as people move from the PC to the Macintosh and not back. This is the pattern, you know. Apple is letting the PC lowballers get people involved with computers. Once they're involved, *then* these people can choose the Macintosh. Why should Apple be responsible for mollycoddling newcomers?

Myth #7: *The Mac will be cheaper when the Taiwanese clones arrive.*

There is no Taiwanese clone coming. It's like waiting for Godot.

Myth #8: *Apple will fail because it bucks the trend toward "open" systems.*

There is *no* trend toward open systems. This is a myth perpetrated by Sun Microsystems, some idealistic writers, and the whining IBM clone makers. The idea of open systems is the biggest crock ever foisted on the public in the entire history of Western Civilization. Congratulations to the high-tech PR firms for this one.

Myth #9: *The Mac is easier to use than the PC.*

Who says this? Mac promoters, that's who. Once you learn how to use the Mac, it's certainly easier to move from application to application — but it's not easier to *use*. In fact some aspects of the Mac are much harder to deal with than they are on the PC.

Take undeleting a trashed file, for example. It's easy to do with the PC; not so with the Macintosh. (If you think the Symantec utilities do a good job of it, then you haven't used a PC.) Actually, the basic MS-DOS operating system is much simpler and easier to use than the complex Macintosh operating system. The Macintosh operating system, on the other hand, is much more powerful. The two characteristics are connected.



Myth #10: *Someday all computers will be like the Mac.*

Dream on. Everyone would be sued by Apple!

BY JOHN C. DVORAK

ILLUSTRATION: ROBERT ZIMMERMAN

Desktop De Mille.



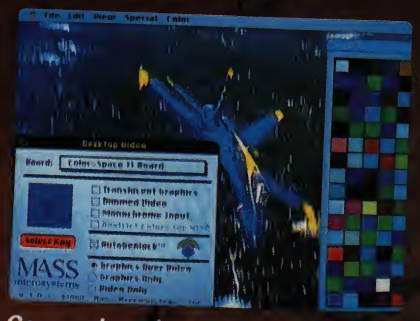
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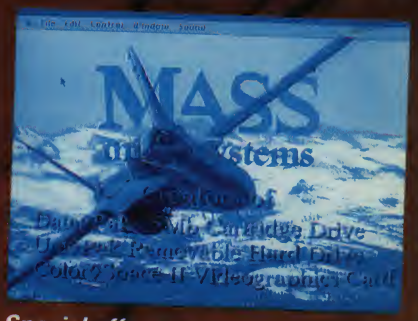
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ColorSpace II™

DESKTOP VIDEO PRODUCTION™

So you wanna be in pictures. Well, with our ColorSpace II videographics card we'll put you one step closer to creating your own multimedia masterpiece. ColorSpace II allows you to produce full color, professional quality videotapes and multimedia presentations in-house, inexpensively, in minutes. Cecil B. should have had it so good! It's easy to install, uses only one slot in your Mac II and is fully compatible with all standard Macintosh II applications including: HyperCard, SuperCard and Director. Use the ColorSpace II card with *or in place of* your Apple Video card, *and* in conjunction with other Macintosh II cards. ColorSpace II is fully NTSC-compatible and works with a wide range of standard consumer and professional NTSC and RGB video equipment. In addition, it supports 256 color, flicker-free graphics on RGB multisync-type monitors.

ColorSpace II's genlocking lets you synchronize your Macintosh graphics to almost any VCR, videodisc, or other standard video signal. Then overlay titling or graphics — mix the two signals together — and display or record the results. In no time you'll be creating eye-popping fly-thru logos and animations over live video. Other advanced features such as translucent graphics and dimmed video background are readily selectable with ColorSpace II's easy-to-use software. And, unlike the competition, ColorSpace II has full RGB-quality mixing of the video and graphics for superb, simultaneous RGB and NTSC video output. ColorSpace II can also capture (digitize) video images from standard NTSC or RGB video sources in as little as 1 second for full color. So if you want to be in pictures get ColorSpace II, get an agent and get famous!

Actual unretouched screen shots

MASS microsystems

Call 800-522-7979 for a dealer near you and to order your video of *ColorSpace II: Hints and Secrets of Desktop Video* for only $19.95



550 Del Rey Avenue ♦ Sunnyvale ♦ California 94086 ♦ In Canada call: 604/276-2326

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Please circle 184 on reader service card.

$200 Cash Rebate
on SuperMac Spectrum/8 Video Boards purchased 10/1/89–12/31/89. Call **(408) 245-2202** for your nearest authorized SuperMac dealer.

The best color is right here in black and white.

INFO WORLD BEST IN ITS CLASS

INFO WORLD

REPORT CARD

Macintosh Color Display Systems

	(InfoWorld weighting)	(Your weighting)	E-Machines T 19 $6,195	Radius Color Display System $6,190	Rasterops Colorboard 108+ $5,790	SuperMac Spectrum/8 Series II $6,095
Price						
Performance	(200)	( )	Very Good	Very Good	Very Good	Very Good
Image Definition	(200)	( )	Excellent	Good	Good	Excellent
Color Duplication	(50)	( )	Satisfactory	Good	Satisfactory	Very Good
Documentation	(100)	( )	Very Good	Very Good	Very Good	Very Good
Setup	(125)	( )	Good	Very Good	Satisfactory	Very Good
Ease of use						
Support	(100)	( )	Very Good	Very Good	Very Good	Very Good
Workmanship	(50)	( )	Satisfactory	Satisfactory	Good	Very Good
Support policies	(50)	( )	Good	Good	Very Good	Very Good
Technical support	(125)	( )	Good	Good	Good	Very Good
Value						
Final scores			**7.3**	**6.8**	**6.5**	**8.0**

When *InfoWorld* evaluated 19-inch color display systems for the Macintosh II family of computers, SuperMac's Spectrum/8 Series II system came out right on top.

Here's what the panel at *InfoWorld* had to say: *"Color duplication on the Spectrum/8 was exceptional. Black was jet black, and white was paper white. Dense purples, true grays, and lemon yellows are characteristic of its vibrant color palette. Brilliant, clear colors that match the Pantone color guide earn this monitor an excellent score in color duplication."* *



Not only did the Spectrum/8 rank high in every category, but it was the *only* system tested to offer built-in Virtual Desktop™ and pan & zoom capabilities. So you can display a small area of your document, zoom in up to 2X to work on the fine details, then pan to the next area you need to finish.

Of course we've always thought the Spectrum/8 was a great deal. But don't take our word for it. Call 408 245-2202, Dept. 300 for a reprint of the *InfoWorld* color display report. And once you've read about it in black and white, make the color display comparison for yourself at your authorized SuperMac dealer.

SUPERMAC TECHNOLOGY

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Dealers please circle 66 on reader service card.

End Users please circle 67 on reader service card.